Vol. 986 Number 1

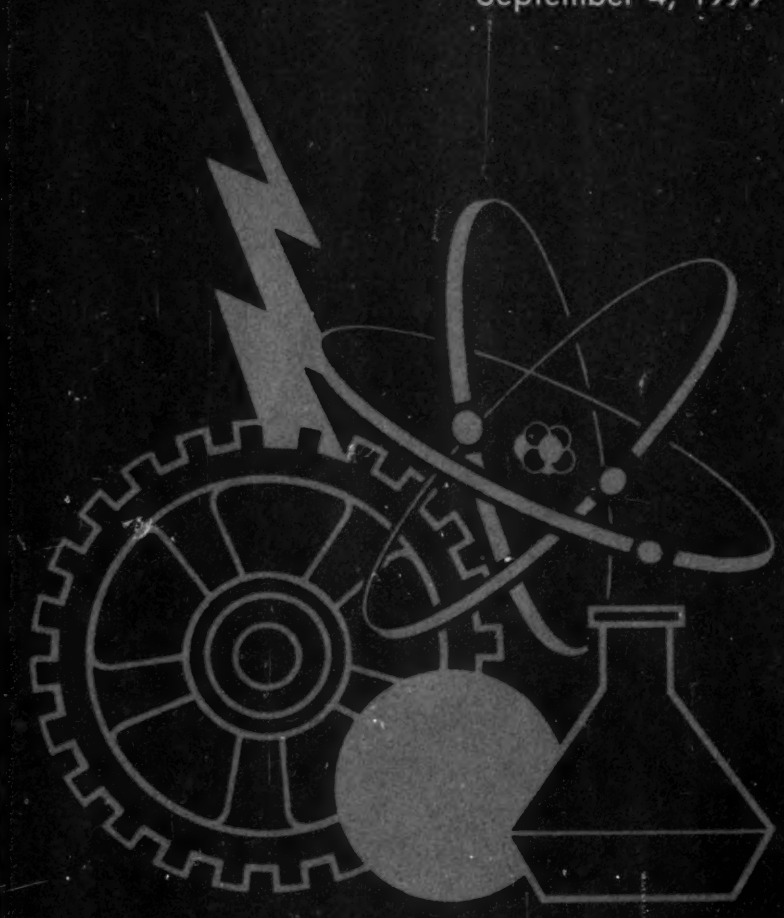
# OFFICIAL GAZETTE

of the

## UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

September 4, 1979



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# OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

September 4, 1979 Volume 986 Number 1


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# PATENT AND TRADEMARK OFFICE NOTICES

## Patent Cooperation Treaty (PCT) Information

For information concerning the PCT, including the amounts of the fees thereunder and the States that may be designated in international applications, consult the notice entitled "Update of information concerning the Patent Cooperation Treaty" appearing in the OFFICIAL GAZETTE of July 3, 1979.

Effective August 1, 1979 the international fees are increased to the following amounts:

| | |
|---|---|
| Basic fee under PCT Rule 15.1(i) for an international application containing 30 sheets or less | $190.00 |
| Supplemental fee to the Basic fee for each page of an international application in excess of 30 sheets | 3.50 |
| Designation fee under PCT Rule 15.1(ii) | 45.00 |

July 3, 1979.

LUTRELLE F. PARKER,
*Acting Commissioner of Patents and Trademarks.*

## REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

**3,913,992,** Re. S.N. 044,791, Filed May 31, 1979, Cl. 308/187, EXTENDED BEARING LUBRICATION METHOD AND APPARATUS, William P. Scott, et al., Owner of Record: *Continental Oil Company, Ponca City, Okla.,* Attorney or Agent: Joseph C. Kotarski, et al., Ex. Gp.: 243

**3,918,768,** Re. S.N. 038,835, Filed May 14, 1979, Cl. 303/92, HYDRAULIC BRAKING SYSTEMS, Glyn Phillip Reginald Farr, Owner of Record: *Girling Limited, Birmingham, England,* Attorney or Agent: Samuel Scrivener, Jr., et al., Ex. Gp.: 315

**3,930,396,** Re. S.N. 047,755, Filed Jun. 12, 1979, Cl. 72/347, DIE SYSTEM FOR CAN BODY PRESS, Everly Martinez, Owner of Record: *Reynolds Metals Company, Richmond, Va.,* Attorney or Agent: John F. C. Glenn, et al., Ex. Gp.: 321

**3,978,726,** Re. S.N. 043,408, Filed May 29, 1979, Cl. 73/189, FLUID CURRENT METER, Hsing-Hua Shih, Owner of Record: *Westinghouse Electric Corporation, Pittsburgh, Pa.,* Attorney or Agent: C. F. Renz, Ex. Gp.: 244

**3,980,390,** Re. S.N. 045,815, Filed Jun. 5, 1979, Cl. 350/96.33, OPTICAL TRANSMISSION FIBER, Yutaka Yamamoto, et al., Owner of Record: *Sumitomo Electric Industries, Ltd., Osaka, Japan,* Attorney or Agent: Richard C. Sughrue, et al., Ex. Gp.: 257

**3,981,267,** Re. S.N. 037,491, Filed May 10, 1979, Cl. 118/7, ELECTROPHOTOGRAPHIC LIQUID DEVELOPING SYSTEM, Kenneth W. Gardiner, et al., Owner of Record: *Savin Business Machines Corporation, Valhalla, N.Y.,* Attorney or Agent: Henry L. Shenier, et al., Ex. Gp.: 166

**4,026,274,** Re. S.N. 038,807, Filed May 14, 1979, Cl. 126/390, TEA KETTLE STRUCTURE, Julian Gutierrez, Owner of Record: *Inventor,* Attorney or Agent: Leo Gregory, Ex. Gp.: 345

**4,028,266,** Re. S.N. 046,108, Filed Jun. 6, 1979, Cl. 252/313 R, STABILIZED HYDROUS PENTAVALENT ANTIMONY OXIDE SOL COMPOSITION, Ronald Francis Langere, et al., Owner of Record: *NL Industries, Inc., New York, N.Y.,* Attorney or Agent: Gary M. Nath, et al., Ex. Gp.: 223

**4,034,474,** Re. S.N. 034,159, Filed Apr. 27, 1979, Cl. 32/20, JAW MOVEMENT SIMULATION, Robert L. Lee, Owner of Record: *Inventor,* Attorney or Agent: Louis J. Knobbe, et al., Ex. Gp.: 333

**4,049,019,** Re. S.N. 045,559, Filed Jun. 4, 1979, Cl. 137/625.21, ROTARY VALVE, Samuel B. McClocklin, Owner of Record: *Owatonna Tool Company, Owatonna, Minn.,* Attorney or Agent: Ernest A. Wegner, et al., Ex. Gp.: 341

**4,063,993,** Re. S.N. 037,181, Filed May 7, 1979, Cl. 156/659, GANG BONDING INTERCONNECT TAPE FOR SEMICONDUCTIVE DEVICES AND METHOD OF MAKING SAME, Carmen D. Burns, Owner of Record: *National Semiconductor Corporation, Santa Clara, Calif.,* Attorney or Agent: Gail W. Woodward, et al., Ex. Gp.: 161

**4,069,149,** Re. S.N. 044,114, Filed May 30, 1979, Cl. 210/44, CONTINUOUS FERMENTATION PROCESS AND APPARATUS, Melbourne L. Jackson, Owner of Record: *Research Corporation, New York, N.Y.,* Attorney or Agent: John W. Malley, et al., Ex. Gp.: 176

**4,100,588,** Re. S.N. 019,968, Filed Mar. 12, 1979, Cl. 361/127, ELECTRICAL OVERVOLTAGE SURGE ARRESTER WITH VARISTOR HEAT TRANSFER AND SINKING MEANS, James S. Kresge, Owner of Record: *General Electric Company, New York, N.Y.,* Attorney or Agent: Richard A. Menelly, Ex. Gp.: 212

**4,120,529,** Re. S.N. 034,671, Filed Apr. 30, 1979, Cl. 296/137 B, REMOVABLE ROOF PANELS FOR VEHICLES, Richard R. Chrysler, Owner of Record: *Cars & Concepts, Inc., Brighton, Mich.,* Attorney or Agent: Hugh L. Fisher, et al., Ex. Gp.: 316

**4,135,504,** Re. S.N. 044,691, Filed Jun. 1, 1979, Cl. 128/80 A, ORTHOPEDIC SUPPORT, Donald C. Spann, Owner of Record: *Inventor,* Attorney or Agent: Ralph Bailey, et al., Ex. Gp.: 335

# PATENT NOTICES

## Certificates of Correction for the Week of Sept. 4, 1979

| | | | |
|---|---|---|---|
| Re. 29,675 | 4,123,473 | 4,143,125 | 4,149,115 |
| 3,784,750 | 4,123,602 | 4,143,238 | 4,149,200 |
| 4,023,186 | 4,125,698 | 4,143,382 | 4,149,260 |
| 4,028,295 | 4,126,125 | 4,143,666 | 4,149,592 |
| 4,053,675 | 4,128,352 | 4,144,153 | 4,150,967 |
| 4,055,602 | 4,129,000 | 4,144,894 | 4,151,800 |
| 4,083,791 | 4,129,705 | 4,144,969 | 4,152,572 |
| 4,087,502 | 4,130,561 | 4,145,238 | 4,152,964 |
| 4,094,035 | 4,130,591 | 4,145,547 | 4,153,099 |
| 4,094,938 | 4,130,718 | 4,146,232 | 4,153,225 |
| 4,100,163 | 4,132,966 | 4,146,848 | 4,153,938 |
| 4,106,916 | 4,133,012 | 4,147,877 | 4,156,847 |
| 4,111,701 | 4,133,035 | 4,148,355 | 4,156,908 |
| 4,113,902 | 4,135,556 | 4,148,704 | 4,157,349 |
| 4,115,921 | 4,136,237 | 4,148,776 | 4,157,422 |
| 4,115,967 | 4,138,255 | 4,148,803 | 4,157,672 |
| 4,121,932 | 4,139,161 | 4,148,825 | 4,158,043 |
| 4,123,239 | 4,139,800 | 4,148,828 | |

## Adverse Decisions in Interferences

In the designated interferences involving the indicated claims of the following patents, final decisions have been rendered that the respective patentees were not the first inventors with respect to the claims listed.

Patent No. 3,639,899, G. R. Ljungkull, PROGRAMMED TRAFFIC SIGNAL AND METHOD OF USING, Interference No. 98,759, decided April 26, 1979, claim 7.

Patent No. 3,772,411, C. W. Uzelmeier, C. W. Schroeder, ALKALI METAL SALTS OF ARALKANOIC OR ARALKENOIC ACIDS TO IMPROVE DYEABILITY OF POLYOLEFIN COMPOSITIONS, Interference No. 98,574, decided February 26, 1979, claims 1 and 2.

Patent No. 3,849,553, F. J. Dea, E. L. Nelson, CYCLIC NUCLEOTIDE THERAPEUTIC PREPARATION, Interference No. 99,708, decided April 11, 1979, claim 3.

Patent No. 3,900,885, M. W. Tallent, W. B. Hendershot, A. L. Swain, R. M. Harrison, TELEVISION SIGNAL TIME BASE CORRECTOR, Interference No. 99,675, decided April 6, 1979, claims 27 and 28.

Patent No. 3,961,359, N. Okuno, T. Kamogawa, K. Kamisaka, VIDEO SIGNAL PROCESSING SYSTEM FOR REPRODUCING A VIDEO SIGNAL FROM A BANDWIDTH LIMITED RECORDED SIGNAL, Interference No. 100,046, decided April 27, 1979, claim 14.

Patent No. 3,983,094, F. X. O'Shea, THERMALLY STABLE POLYURETHANE ELASTOMERS PRODUCED FROM POLY(OXYPROPYLENE) - POLY(OXYETHYLENE) GLYCOLS OF HIGH OXYETHYLENE GROUP CONTENT, Interference No. 99,674, decided April 3, 1979, claims 1 through 3.

Patent No. 3,991,201, J. Heeres, L. J. J. Backx, J. H. Mostmans, 1(β-ARYL-β-R-ETHYL) IMIDAZOLES AS ANTIMICROBIAL AGENTS, Interference No. 99,965, decided June 29, 1979, claims 1 and 8.

Patent No. 3,999,940, R. E. Freeman, MULTICOLORED PILE MATERIALS AND PROCESSES FOR MAKING THE SAME, Interference No. 99,822, decided April 12, 1979, claims 1 and 4.

Patent No. 4,025,790, H. L. Jetter, K. Gurs, W. Englisch, METHOD FOR SEPARATING ISOTOPES BY MEANS OF LASERS, Interference No. 100,012, decided April 13, 1979, claims 1, 3 through 6, 14, and 20 through 23.

Patent No. 4,031,084, S. Kukolja, D. O. Spry, PROCESS FOR CEPHALOSPORIN ANTIBIOTIC INTERMEDIATES, Interference No. 100,022, decided May 7, 1979, claims 1 through 10.

Patent No. 4,036,578, R. M. Herman, PHOTOFLASH ARRAY AND METHOD OF CONSTRUCTION, Interference No. 99,854, decided May 30, 1979, claims 2, 5, 6, 7 and 9.

## Disclaimers

4,083,700.—*Lewis H. Bowers*, Scotia, *Raymond E. Jankowski*, Schenectady, and *John L. Sullivan*, Ballston Lake, N.Y. NOVOLAK-ABS RESIN BINDER IN A GRINDING WHEEL. Patent dated Apr. 11, 1978. Disclaimer filed June 11, 1979, by the asignee, *Schenectady Chemicals, Inc.*

Hereby enters this disclaimer to claims 1, 6, 7 and 8 of said patent.

4,085,331.—*Malcolm Thackray*, Sutherland, Australia. SOURCES OF NUCLEAR RADIATION. Patent dated Apr. 18, 1978. Disclaimer filed July 13, 1979, by the assignee, *Australian Atomic Energy Commission.*

Hereby enters this disclaimer to claims 1 to 5 and 14 of said patent.

4,147,690.—*Russell P. Rich*, Baltimore, Md. SMOKE AND FIRE RESISTANT COMPOSITIONS. Patent dated Apr. 3, 1979. Disclaimer filed July 9, 1979, by the assignee, *The Burns & Russell Company.*

Hereby enters this disclaimer to claims 1 and 25 of said patent.

4,152,602.—*Donald J. Kaminski*, Trafford, and *Charles H. Boyd*, Plum Borough, Pa. NUCLEAR FUEL RACK LATERAL RESTRAINT. Patent dated May 1, 1979. Disclaimer filed July 2, 1979, by the assignee, *Westinghouse Electric Corporation.*

Hereby enters this disclaimer to claims 1 and 5 of said patent.

## National Technical Information Service

GOVERNMENT-OWNED INVENTIONS

*Notice of Availability for Licensing*

The invention listed below are owned by the U.S. Government and are available for domestic and possibly foreign licensing in accordance with the licensing policies of the agency-sponsors.

Copies of the patents cited are available from the Commissioner of Patents and Trademarks, Washington, D.C. 20231, for $.50 each. Requests for copies of patents must include the patent number.

Copies of the patent applications can be purchased from the National Technical Information Service (NTIS), Springfield, Va. 22161 for $4.00 ($8.00 outside North American Continent). Requests for copies of patent applications must include the patent application number. Claims are deleted from patent application copies sold to the public to avoid premature disclosure in the event of an interference before the Patent and Trademark Office. Claims and other technical data will usually be made available to serious prospective licensees by the agency which filed the case.

Requests for licensing information on a particular invention should be directed to the address cited for the agency-sponsor.

DOUGLAS J. CAMPION,
*Patent Program Coordinator,*
*National Technical Information Service.*

U.S. DEPARTMENT OF THE AIR FORCE
AF/JACP, 1900 Half St., SW., Washington, D.C. 20324

Patent application 6-000,240. Instantaneous Frequency Measurement (IFM) Receiver With Capability To Separate CW and Pulsed Signals. Filed Dec. 22, 1978.

Patent application 6-002,280. Foolproof Timing Mechanism. Filed Jan. 10, 1979.

Patent application 6-005,885. Radar Sensitivity Time Control Using Range Gated Feedback. Filed Jan. 23, 1979.

Patent application 6-008,144. Doubly Adaptive CFAR Apparatus. Filed Jan. 31, 1979.

Patent 4,140,225. Sheet Material Storage Rack. Filed July 29, 1977. Patented Feb. 20, 1979. Not available NTIS.

Patent 4,140,592. Gas Bearing Surface Coating. Filed Mar. 30, 1978. Patented Feb. 20, 1979. Not available NTIS.

U.S. DEPARTMENT OF ENERGY
Assistant General Counsel for Patents
Washington, D.C. 20545

Patent application 841,088. Solar Collector Cover Plate. Filed Oct. 11, 1977.

Patent application 880,247. Composition and Method for Collecting Radioiodine. Filed. Feb. 22, 1978.

Patent application 901,048. Method and Apparatus for Improved Optoacoustic Spectroscopy. Filed Apr. 28, 1978.

Patent 4,072,501. Method of Producing Homogeneous Mixed Metal Oxides and Metal—Metal Oxide Mixtures. Filed Apr. 13, 1977. Patented Feb. 7, 1978. Not available NTIS.

Patent 4,096,912. Methods for Minimizing Plastic Flow of Oil Shale During In Situ Retorting. Filed June 6, 1977. Patented June 27, 1978. Not available NTIS.

Patent 4,099,515. Fabrication of Trough-Shaped Solar Collectors. Filed June 29, 1977. Patented July 11, 1978. Not available NTIS.

Patent 4,114,592. Cylindrical Radiant Energy Direction Device With Refractive Medium. Filed Aug. 16, 1976. Patented Sept. 19, 1978. Not available NTIS.

Patent 4,115,632. Method of Preparing Electrolyte for Use in Fuel Cells. Filed May 5, 1977. Patented Sept. 19, 1978. Not available NTIS.

U.S. DEPARTMENT OF THE NAVY
Assistant Chief for Patents, Office of Naval Research
Code 302, Arlington, Va. 22217

Patent application 6–008,997. Protected Calcium Anode in Molten Nitrates. Filed Feb. 5, 1979.

Patent application 6–008,998. Non-Flashing Electrolyte for Use With Calcium Anode. Filed Feb. 5, 1979.

Patent application 6–009,038. High Energy Density Thermal Cell. Filed Feb. 5, 1979.

Patent application 6–016,236. High Electrical Frequency Infrared Detector. Filed Feb. 28, 1979.

Patent application 6–017,217. High Electrical Frequency Infrared Detector. Filed Mar. 5, 1979.

Patent 4,104,883. Mass Transport Heat Exchanger Method and Apparatus for Use in Ocean Thermal Energy Exchange Power Plants. Filed May 27, 1977. Patented Aug. 8, 1978. Not available NTIS.

Patent 4,132,226. Biopotential Movement Artifact Inhibiting System. Filed July 13, 1977. Patented Jan. 2, 1979. Not available NTIS.

Patent 4,136,281. Energy Fluence Meter for X-Rays. Filed Oct. 12, 1977. Patented Jan. 23, 1979. Not available NTIS

Patent 4,137,509. Tunable Laser Based Upon S2, Te2 and Other Selected Dimers. Filed May 2, 1977. Patented Jan. 30, 1979. Not available NTIS.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Assistant General Counsel for Patent Matters—NASA
Code GP–2, Washington, D.C. 20546

Patent application 6–009,886. Apparatus for Supplying Conditioned Air at a Substantially Constant Temperature and Humidity. Filed Feb. 6, 1979.

Patent application 6–017,885. Multibeam Single Frequency Synthetic Aperture Radar Processor for Imaging Separate Range Swaths. Filed Mar. 6, 1979.

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U.S. DEPARTMENT OF THE AIR FORCE
AF/JACP, 1900 Half St., SW., Washington, D.C. 20324

Patent application 6–001,329. Double Acting Delay Mechanism. Filed Jan. 5, 1979.

Patent application 6–001,330. Incident Radiation Absorber/Reflector Assembly. Filed Jan. 5, 1979.

Patent application 6–001,334. Incident Radiation Absorber. Filed Jan. 5, 1979.

Patent application 6–002,163. Aircraft Ejection System Collision Avoidance System. Filed Jan. 9, 1979.

Patent application 6–002,281. Stress Buffer/Amortisseur for a Permanent Magnet Rotor. Filed Jan. 10, 1979.

Patent application 6–004,244. Spherical Heat Pipe Metal-Hydrogen Cell. Filed Jan. 17, 1979.

U.S. DEPARTMENT OF THE NAVY
Assistant Chief for Patents, Office of Naval Research
Code 302, Arlington, Va. 22217

Patent application 6–001,516. Charge-Coupled Device (CCD) Analog and Digital Correlators. Filed Jan. 8, 1979.

Patent application 6–004,428. Turbomachine Balance Correction System. Filed Jan. 12, 1979.

Patent application 6–009,206. Commutating Narrowband Filter. Filed Feb. 15, 1979.

Patent application 6–011,821. Method for Determining the Compensation Density in n-Type Narrow-Gap Semiconductors. Filed Feb. 13, 1979.

Patent application 6–012,614. Rotating Raster Generator. Filed Feb. 16, 1979.

Patent application 6–014,798. Three dB Single Mode Optical Fiber Interferometer Beamsplitter/Coupler. Filed Feb. 26, 1979.

Patent application 6–017,749. Wideband VHF Antenna. Filed Mar. 5, 1979.

Patent application 814,946. Solventless Amire Epoxy Resin System. Filed July 22, 1977.

Patent application 961,580. Frequency Stabilization Technique for Microstrip Oscillators. Filed Nov. 17, 1978.

Patent 4,125,788. Voltage Level Shifting Device. Filed May 31, 1977. Patented Nov. 14, 1978. Not available NTIS.

Patent 4,125,809. Digital C/kT Meter. Filed Nov. 9, 1977. Patented Nov. 14, 1978. Not available NTIS.

Patent 4,125,862. Aspect Ratio and Scan Converter System. Filed Mar. 31, 1977. Patented Nov. 14, 1978. Not available NTIS.

Patent 4,136,317. 14 and 16 Micron, Optically Pumped Gas Dynamic CO2 Laser. Filed Apr. 13, 1977. Patented Jan. 23, 1979. Not available NTIS.

Patent 4,137,461. Photographic Image Enhancement by Photofission. Filed Nov. 16, 1977. Patented Jan. 30, 1979. Not available NTIS.

Patent 4,140,936. Square and Rectangular Electroacoustic Bender Bar Transducer. Filed Sept. 1, 1977. Patented Feb. 20, 1979. Not available NTIS.

Patent 4,143,946. Impingement Cooled Deformable Laser Mirror. Filed Dec. 5, 1977. Patented Mar. 13, 1979. Not available NTIS.

U.S. DEPARTMENT OF COMMERCE
National Technical Information Service, Office of Government Inventions and Patents, Springfield, Va. 22161

Patent application 915,068. Universal Jig Fixture for Castings. Filed June 12, 1978.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Assistant General Counsel for Patent Matters—NASA
Code GP–2, Washington, D.C. 20546

Patent application 6–009,888. Coupling Device for Moving Vehicles. Filed Feb. 6, 1979.

Patent application 807,597. Apparatus for Endoscopic Examination. Filed June 17, 1977.

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U.S. DEPARTMENT OF THE AIR FORCE
AF/JACP, 1900 Half St., SW., Washington, D.C. 20324

Patent application 6–005,111. Method and Apparatus for Trimming IR/CCD Mosaic Sensors. Filed Jan. 22, 1979.

Patent application 6–006,839. Apparatus and Method for Integrated Circuit Test Analysis. Filed Jan. 26, 1979.

Patent application 6–006,840. Laser Gas Temperature Control and Spacial Equalizer. Filed Jan. 26, 1979.

U.S. DEPARTMENT OF AGRICULTURE
Research Agreements and Patent Branch, General Service Division, Federal Bldg., Agricultural Research Service
Hyattsville, Md. 20782

Patent application 970,941. Apparatus for Tying Cauliflower. Filed Dec. 19, 1978.

U.S. DEPARTMENT OF TRANSPORTATION
Patent Counsel, 400 7th St. SW., Washington, D.C. 20590

Patent application 013,514. Automated Gain Control in Rail Flaw Detection. Filed Feb. 21, 1979.

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
National Institutes of Health, Chief, Patent Branch
Westwood Bldg., Bethesda, Md. 20205

Patent application 966,329. Horizontal Flow-Through Coil Planet Centrifuge. Filed Dec. 4, 1978.

Patent application 971,550. Hydrogel Adhesives and Sandwiches or Laminates. Filed Dec. 20, 1978.

Patent 4,137,248. Compound, 4–Carboxyphthalato(1,2-Diaminocyclohexane)-Platinum(II) and Alkali Metal Salts Thereof. Filed Aug. 29, 1977. Patented Jan. 30, 1979. Not available NTIS.

Patent 4,139,713. Steroidal Intermediates From the Condensation Product of Dimethyl-3–Ketogluterate and Glyoxal. Filed July 19, 1977. Patented Feb. 13, 1979. Not available NTIS.

Patent 4,144,237. Synthetic Vinblastine and Vincristine Derivatives. Filed June 13, 1977. Patented Mar. 13, 1979. Not available NTIS.

U.S. DEPARTMENT OF THE NAVY
Assistant Chief for Patents, Office of Naval Research
Code 302, Arlington, Va. 22217

Patent application 965,121. Method and Article of Manufacturing an Optical Fiber Connector. Filed Nov. 30, 1978.

Patent 4,125,316. Integrated Optical Matrix Multiplier. Filed May 23, 1977. Patented Nov. 14, 1978. Not available NTIS.

Patent 4,136,107. Bisorthodinitriles. Filed Oct. 20, 1977. Patented Jan. 23, 1979. Not available NTIS.

Patent 4,137,098. Solar Energy Window. Filed Oct. 20, 1977. Patented Jan. 30, 1979. Not available NTIS.

Patent 4,138,082. Remotely Operated, X-Y Translation Slide With Stationary Motors. Filed May 27, 1977. Patented Feb. 6, 1979. Not available NTIS.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Assistant General Counsel for Patent Matters—NASA
Code GP–2, Washington, D.C. 20546

Patent application 6–007,083. High Toughness-High Strength Iron Alloy. Filed Jan. 25, 1979.

Patent application 6–011,737. Mixed Diamines for Lower Melting Addition Polyimide Preparation and Utilization. Filed Feb. 13, 1979.

Patent application 903,019. Borehole Geological Assessment. Filed May 4, 1978.

Patent application 953,313. Coaxial Phased Array Antenna. Filed Oct. 17, 1978.

Patent application 956,168. Method for Applying Photographic Resists to Otherwise Incompatible Substrates. Filed Oct. 31, 1978.

Patent application 965,368. Interferometer. Filed Nov. 30, 1978.

Patent 3,173,801. Electromagnetic Radiation Energy Arrangement. Filed May 26, 1961. Patented Mar. 16, 1965. Not available NTIS.

Patent 3,262,694. Solar Cell Module Assembly Jig. Filed June 10, 1963. Patented July 26, 1966. Not available NTIS.

Patent 4,110,703. Volumetric Direct Nuclear Pumped Laser. Filed Apr. 19, 1977. Patented Aug. 29, 1978. Not available NTIS.

## Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries

The libraries listed herein, designated as patent depository libraries, receive current issues of U.S. Patents and maintain collections of earlier issued patents. The scope of these collections varies from library to library, ranging from patents of only recent months or years in some libraries to all or most of the patents issued since 1870, or earlier, in other libraries.

These patent collections are open to public use and each of the patent depository libraries, in addition, offers the publications of the patent classification system (e.g. The Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions, etc.) and provides technical staff assistance in their use to aid the public in gaining effective access to information contained in patents. With one exception, as noted in the table following, the collections are organized in patent number sequence.

Depending upon the library, the patents may be available in microfilm, in bound volumes of paper copies, or in some combination of both. Facilities for making paper copies from either microfilm in reader-printers or from the bound volumes in paper-to-paper copies are generally provided for a fee.

Owing to variations in the scope of patent collections among the patent depository libraries and in their hours of service to the public, anyone contemplating use of the patents at a particular library is advised to contact that library, in advance, about its collection and hours, so as to avert possible inconvenience.

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| | St. Louis Public Library | (314) 241-2288 Ext. 214 |
| Nebraska | Lincoln: University of Nebraska-Lincoln, Love Library | (404) 472-3411 |
| New Jersey | Newark Public Library | (201) 733-7740 |
| New York | Albany: New York State Library | (518) 474-5125 |
| | Buffalo and Erie County Public Library | (716) 856-7525 Ext. 267 |
| | New York Public Library (The Research Libraries) | (212) 790-6291 |
| North Carolina | Raleigh: D. H. Hill Library, N.C. State University | (919) 737-3280 |
| Ohio | Cincinnati & Hamilton County Public Library | (513) 369-6969 |
| | Cleveland Public Library | (216) 623-2932 |
| | Columbus: Ohio State University Libraries | (614) 422-6286 |
| | Toledo/Lucas County Public Library | (419) 242–7361 Ext. 258 |
| Oklahoma | Stillwater: Oklahoma State University Library | (405) 624-6546 |
| Pennsylvania | Philadelphia: Franklin Institute Library | (215) 448-1226 |
| | Pittsburgh: Carnegie Library of Pittsburgh | (412) 622-3128 |
| | University Park: The Pennsylvania State Libraries | (814) 865-4861 |
| Rhode Island | Providence Public Library | (401) 521-7722 Ext. 224 |
| Tennessee | Memphis & Shelby County Public Library and Information Center | (901) 528-2957 |
| Texas | Dallas Public Library | (214) 748-9071 |
| | Houston: The Fondren Library, Rice University | (713) 527-8101 Ext. 2587 |
| Washington | Seattle: Engineering Library, University of Washington | (206) 543-0740 |
| Wisconsin | Madison: Kurt F. Wendt Engineering Library, University of Wisconsin | (608) 262-6845 |
| | Milwaukee Public Library | (414) 278-3043 |

*Collection organized by subject matter.

# PATENT EXAMINING CORPS

**RENE D. TEGTMEYER, Assistant Commissioner**

**WILLIAM FELDMAN, Deputy Assistant Commissioner**

## CONDITION OF PATENT APPLICATIONS AS OF APRIL 21, 1979

| PATENT EXAMINING GROUPS | Actual Filing Date of Oldest New Case Awaiting Action |
|---|---|
| **CHEMICAL EXAMINING GROUPS** | |
| GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metallurgical Apparatus; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices. | 8-11-78 |
| GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides. | 5-2-78 |
| HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, Treating Processes, and Apparatus Therefor; Irradiation (Part); Bleaching; Dyeing; Leather, Fur and Textile Treating Compositions. | 7-6-78 |
| COATING, LAMINATING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes, Apparatus and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; and Photography. | 3-20-78 |
| SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes. | 12-1-77 |
| **ELECTRICAL EXAMINING GROUPS** | |
| INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Horology; Acoustics; Recorders; Weighing Scales. | 11-2-77 |
| SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Lubrication; Illumination; Nuclear and Reactors; Radar; Directional Radio; Torpedoes; Seismic Exploring; Cathode Ray Tube Circuitry; Cryptograph; Laser Devices; Radioactive Materials; Power Metallurgy, Rocket Fuels. | 2-3-78 |
| INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—N. ANSHER, Director. Communications; Multiplexing Techniques; Television; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts. | 6-1-78 |
| RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—A. L. SMITH, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating. | 8-25-78 |
| ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring. | 8-25-77 |
| DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts. | 5-17-77 |
| **MECHANICAL EXAMINING GROUPS** | |
| HANDLING AND TRANSPORTING MEDIA, GROUP 310—M. M. NEWMAN, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment. | 2-22-78 |
| MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion-Bonding, Metal Founding; Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks; Fishing, Etc.; Butchering; and Books and Printed Matter. | 5-11-78 |
| AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—B. R. GRAY, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Plants; Harvesting; Earth Working and Excavating; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Information Dissemination. | 4-7-78 |
| HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—D. J. STOCKING, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication. | 1-30-78 |
| GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—G. M. FORLENZA, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Textiles; Apparel and Shoes; Sewing Machines; Machine Elements; Clutches. | 12-20-77 |

**Expiration of patents:** The patents within the range of numbers indicated below expire during April 1979, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 3,027,558 to 3,031,668, inclusive
Plant Patents..... Numbers 2,135 to 2,142, inclusive

# DEFENSIVE PUBLICATIONS

## PUBLISHED SEPTEMBER 4, 1979

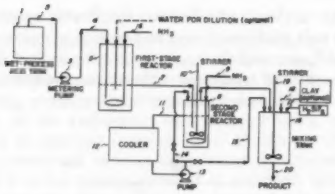
Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O.G. 687. The abstracts of Defensive Publication applications are identified by distinctly numbered series and are arranged chronologically. The heading of each abstract indicates the number of pages of specification, including claims and sheets of drawings contained in the application as originally filed. The files of these applications are available to the public for inspection and reproduction may be purchased for 30 cents a sheet.

Defensive Publication applications have not been examined as to the merits of alleged invention. The Patent and Trademark Office makes no assertion as to the novelty of the disclosed subject matter.

### T986,001
### PRODUCTION OF SUSPENSION FERTILIZERS FROM ORTHOPHOSPHORIC ACID

**Thomas M. Jones, and John M. Stinson, both of Sheffield, Ala., assignors to Tennessee Valley Authority**

**Filed Oct. 2, 1978, Ser. No. 947,684**
**Int. Cl.[2] C05B *7/00***
**U.S. Cl. 71—37**
**1 Sheets Drawing. 27 Pages Specification**




An improved process for production of concentrated high-analysis nitrogen-phosphate base suspension fertilizer by ammoniation of wet-process or other orthophosphoric acids in two stages. The process improvement involves the addition of a small amount (0.1–0.5 percent) of a crystal modifier, fluosilicic acid, for prevention of settling of crystals in the suspension during vibration such as that which occurs during shipment. With use of the crystal modifier, the monoammonium phosphate crystals formed are small and needlelike, and suspension fertilizers with excellent shipping, storage, and handling properties are produced with an $N:P_2O_5$ weight ratio in the range of highest solubility, about 0.27 to 0.33.

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### T986,002
### GRANULATION OF FERTILIZER BORATE

**Cecil P. Harrison, Florence, Ala., assignor to Tennessee Valley Authority**

**Filed Sep. 5, 1978, Ser. No. 939,541**
**Int. Cl.[2] C05D *9/00***
**U.S. Cl. 71—64 D**
**No Drawing. 15 Pages Specification**

Method for granulating crystalline fertilizer borate yielding improved product re bulk blending, handling, and storage by processing solid feedstock with small amounts of mineral acid solution. The process, which requires no drying step, comprises an improved method for converting a relatively easily prepared, nongranular, fine-crystal boron compound, sodium tetraborate pentahydrate, to granular form suitable in particle-size distribution, hardness, solubility, and other important characteristics for direct inclusion into bulk blended fertilizers to produce homogeneous, nonsegregating blends according to methods preferred by blend manufacturers. It has the particular advantage over the melt-flaking-sizing method, presently employed commercial practice of conversion of sodium tetraborate pentahydrate to suitable particle-size distribution for blending, in that it is a low-energy process and does not elevate the boron content of the product. Elevation of boron content is a distinct disadvantage in the production of granular micronutrients for fertilizer use in prior-art processes since it naturally decreases the number of particles that will carry a given amount of boron to the field and thus results in a more diffuse scattering of particles and consequent reduction in average proximity of the nutrient to plant roots.

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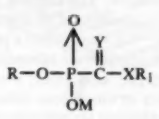
### T986,003
### METHOD FOR CONTROLLING HERBACEOUS WEEDS

**George E. Barrier, 1 Wedgewood Dr. Fairville Hills, Chadds Ford, Pa. 19317**

**Filed Feb. 21, 1979, Ser. No. 13,121**
**Int. Cl.[2] A01N *9/36***
**U.S. Cl. 71—86**
**No Drawing. 21 Pages Specification**

This invention relates to the control of herbaceous weeds such as bindweed, maidencane, arrowhead and sedges by applying to the locus of the weeds a compound selected from compounds having the following formula



where
R is alkyl of 1 to 3 carbon atoms, allyl or benzyl;
$R_1$ is M, alkyl of 1 to 3 carbon atoms, alkenyl of 3 to 4 carbon atoms or benzyl;
M is lithium, sodium, potassium or ammonium;
X is oxygen or sulfur; and
Y is oxygen or sulfur
with the proviso that when Y is sulfur, X is sulfur.

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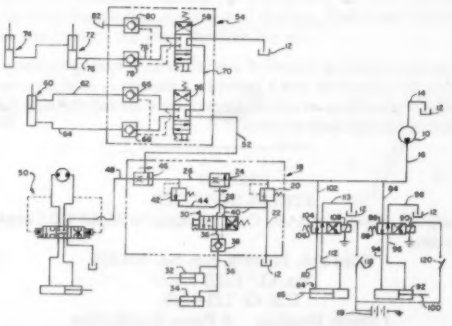
### T986,004
### HYDRAULIC SYSTEM FOR HARVESTING MACHINES

**Norman G. Stroup, Orion, and Eugene J. Krukow, Cordova, both of Ill., assignors to International Harvester Company, Chicago, Ill.**

**Filed Sep. 5, 1978, Ser. No. 939,307**
**Int. Cl.[2] F15B *11/16***
**U.S. Cl. 91—516**
**1 Sheets Drawing. 11 Pages Specification**



An open center hydraulic system in which a pair of flow di-

vider valves is connected in series with the system's hydraulic pump to create a parasitic pressure upstream of these flow valves and the feeder and separator clutches are controlled remotely by simple solenoid actuated two-position valves. The cylinders actuating the clutches are of sufficient size upon application of the minimum parasitic pressure to hold the clutches in a given position so that no center neutral position is necessary on the two-position valves.

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**T986,005**

## PHOTOGRAPHIC FILMS

**Alan H. Cook, Manningtree, England, assignor to Bexford Limited, London, England**

**Continuation of Ser. No. 867,928, Jan. 9, 1978, abandoned. This application Dec. 20, 1978, Ser. No. 971,217**

**Claims priority, application United Kingdom, Nov. 15, 1977, 47444/77**

**Int. Cl.[2] G03C *1/78***

**U.S. Cl. 96—87 R**

**No Drawing. 22 Pages Specification**

Light-sensitive photographic emulsion layers of photographic films are bonded directly, i.e. without an intermediate gelatin subbing layer, to a polymeric subbing layer containing adhesion-promoting particles of an inorganic oxide such as silica having a nominal particle size of 0.001 to 10 μm and present in an amount 5 to 80% by weight. The polymeric subbing layer may be corona discharge treated before the application of the photographic emulsion layer. The subbing polymer may comprise a homopolymer or copolymer of styrene; a copolymer of butadiene; a copolymer of a vinyl ester; a polyester or copolyester; a polyurethane; a copolymer comprising an acrylic acid ester and/or a methacrylic acid ester; a copolymer of vinyl chloride; or a copolymer of vinylidene chloride. The preferred film support is a polyethylene terephthalate film.

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**T986,006**

## AIR CIRCULATION SYSTEM/CAB

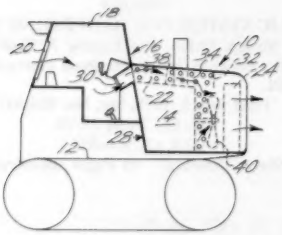
**Gerald P. Simmons, Washington, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Dec. 26, 1978, Ser. No. 973,650**

**Int. Cl.[2] B60H *1/00***

**U.S. Cl. 98—2**

**2 Sheets Drawing. 6 Pages Specification**




In an air circulating system of a work vehicle having an operator's cab, a manifold and a radiator, a plenum is used for controllably passing an air stream from outside the cab through the cab to a radiator and manifold.

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**T986,007**

## STRESS DIFFUSER

**Joseph D. Papia, Torrance, Calif., assignor to Mobil Oil Corporation**

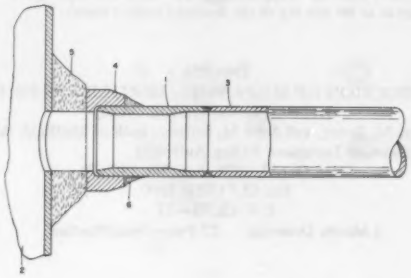
**Filed Feb. 21, 1978, Ser. No. 879,656**

**Int. Cl.[2] F22B *37/22***

**U.S. Cl. 122—360**

**1 Sheets Drawing. 6 Pages Specification**

Means are provided for diffusing stresses, particularly in couplings between vertical heater tubes **2** and the connection to a tube (pigtail) **3** leading to a manifold, arising from temperature changes during start-up or shut-down, bending moments and vibration during operation. The stress diffuser may be installed at the connection of the manifold connection such as a "pigtail", to a heater tube and is constituted by a short tube **1**




machined to varying inside diameter (preferably constant OD) by tapered wall thickness from a mid-section of maximum wall thickness to lesser wall thickness toward the ends of the stress diffuser. For ease of repair and replacement, the stress diffuser is fitted in a collar **4** on the heater tube.

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**T986,008**

## APPARATUS FOR HOLDING PLATES BEING SUBJECTED TO MULTIPLE DEVELOPMENT UNDER CONTROLLED TIME

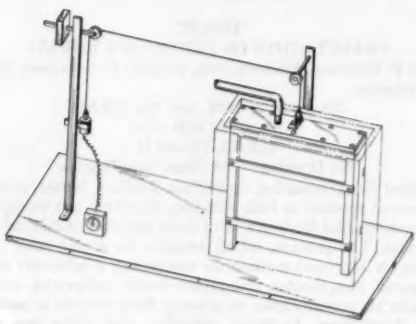
**Samuel Gordon, 393 Blauvelt Rd., Pearl River, N.Y. 10965, and Milon W. Bullock, Hopewell-Woodsville Rd., Hopewell, N.J. 08525**

**Filed Jan. 24, 1979, Ser. No. 6,066**

**Int. Cl.[2] B01D *15/08***

**U.S. Cl. 210—198 C**

**4 Sheets Drawing. 7 Pages Specification**



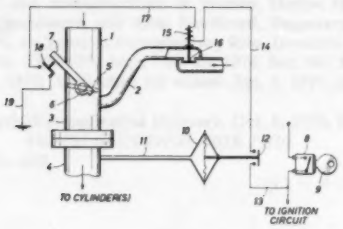
A thin layer plate chromatography apparatus having a container for holding an elution solvent, an open bottom frame for holding one or more plates in the container. The frame has at least one aperture for forcing a drying gas such as nitrogen over the plate. Means for raising and dropping the frame in the container is solenoid operated and a timer is connected to the solenoid so a timed sequence is provided for lowering into the reservoir, removal from the reservoir and drying can be varied according to a preset program. Preferably each subsequent development is slightly larger than the prior development.

**T986,009**

## FUEL FLOW REGULATOR FOR CARBURETORS

**Patrick J. Muller, Saint-Etienne-du-Rouvray, France, assignor to Shell Oil Company**

**Filed Nov. 24, 1978, Ser. No. 963,251**
**Claims priority, application France, Jan. 12, 1978, 78 00809**
**Int. Cl.[2] F02M *3/04***
**U.S. Cl. 261—69 R**
**3 Sheets Drawing. 10 Pages Specification**




Improved fuel consumption rates are achieved by utilizing a novel flow regulator on a standard carburetor used in an internal combustion controlled ignition engine. The flow regulator comprises a pressure detector connected to the fuel-air mixing chamber of the carburetor, said detector being capable of detecting an absolute pressure lower than a pre-determined limit. A control link between the pressure detector and the fuel inlet valve to the mixing chamber is provided, which link is able to close the valve when it is detected that the absolute pressure in the mixing chamber falls below the predetermined limit, such as when the engine is decelerating. In the case of a gaseous fuel carburetor, the fuel inlet valve may be located in the main gas inlet line, whereas in the case of a liquid fuel carburetor, the fuel inlet valve may be located in the idle fuel line.

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**T986,010**

## SIMPLIFIED BATCH CLARIFICATION OF LIQUID AMMONIUM POLYPHOSPHATE

**Kenneth E. McGill, Sheffield, Ala., and Eugene B. Wright, Jr., Lawrenceburg, Tenn., assignors to Tennessee Valley Authority**

**Filed Oct. 10, 1978, Ser. No. 949,723**
**Int. Cl.[2] C01B *15/16, 25/26***
**U.S. Cl. 423—305**
**2 Sheets Drawing. 33 Pages Specification**

Particulate carbonaceous matter in ammonium polyphosphate liquid made from impure wet-process phosphoric acid is removed batchwise by intimately mixing the liquid with a combination of selected organic flocculating agents and then allowing the mixture to separate. The particulate carbonaceous matter floats rapidly to the surface and the clarified liquid that contains essentially no particulate carbonaceous matter is withdrawn from the bottom of the separation vessel. The particulate carbonaceous matter, a minor portion of the input ammonium polyphosphate liquid, and the flocculating agents are then intimately remixed with an additional fresh charge of black ammonium polyphosphate liquid to allow reuse of flocculant not combined with the particulate carbon material in the original charge. This reuse of flocculant may be repeated as many as five times. After the flocculant is inactive, the carbonaceous matter, the inactive flocculant, and a minor portion of the input ammonium polyphosphate liquid are then withdrawn and processed into fluid or solid fertilizers. In some instances, more flocculant is added to the mixing vessel.

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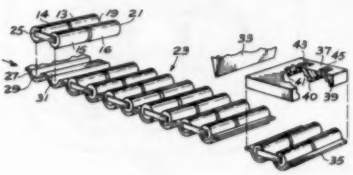
**T986,011**

## BATTERY PACKAGE AND ASSEMBLY

**Peter Affolter, 281 Manitou Beach Rd., Hilton, N.Y. 14468, and Michael A. Matharani, 249 Pennels Dr., Rochester, N.Y. 14626**

**Filed Feb. 23, 1979, Ser. No. 14,670**
**Int. Cl.[2] H01M *2/10***
**U.S. Cl. 429—157**
**1 Sheets Drawing. 9 Pages Specification**



A battery package includes a plurality of cylindrical cells electrically connected in series and wrapped in a plastic web. The web includes a plurality of adjacent, parallel arches or arcuate sections that conform generally to the cylindrical shape of the cells to constrain the cells in the package in a predetermined relationship. Although the web is somewhat flexible, it provides a generally rigid package when secured around the cells. In one embodiment, a single web engages the cells against a more solid structural piece to define a stable battery structure. In another embodiment the cells are encased in opposed plastic webs, each having a plurality of arches separated by intermediate sections. The opposed webs are then sealed together at the intermediate sections to capture the cells between the arches and to rigidify the overall battery structure. In still another embodiment, two cells, welded together end-to-end, are inserted into a tube of plastic shrink wrap. When the wrap is heated, it contracts around the cells, holding them together in a substantially rigid structure. In at least the first-mentioned of the above embodiments, the web can be used to facilitate handling of a plurality of the multi-cell batteries during manufacture and storage. Individual batteries would then be cut from the web for use.

# REISSUES

## SEPTEMBER 4, 1979

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

### Re. 30,088

### METHOD AND A DEVICE FOR DETERMINING THE CROSS-SECTIONAL DIMENSIONS OF THE INNER SPACE OF ELONGATED, TUBULAR BODIES

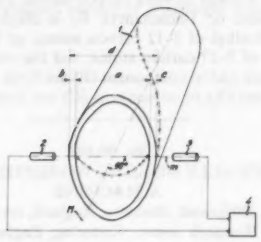
**Svend A. Lund, Birkerod; Hans N. Hansen, Herlev; Helge A. Holst, Copenhagen, and Allan Northeved, Bagsvaerd, all of Denmark, assignors to Forsogsanlaeg Riso, Denmark**

**Original No. 3,850,026, dated Nov. 26, 1974, Ser. No. 183,464, Sep. 24, 1971. Application for reissue Jan. 4, 1977, Ser. No. 756,674**

**Claims priority, application Denmark, Oct. 6, 1970, 5086/70**

**Int. Cl.[2] G01N *29/00*; G01B *17/02***

**U.S. Cl. 73—622** **6 Claims**



1. A method of mapping the cross-sectional dimensions of elongated tubular bodies by the use of measuring means along a measuring line fixed in relation to the measuring means and extending tranversely of the longitudinal axis of a tubular body, the method comprising the steps of: providing relative movement between the tubular body and the measuring means to successively bring the measuring means into positions corresponding to the cross-sectional dimensions to be measured, activating the measuring means to measure along the measuring line the distances from points fixed in relation to the measuring means to the external surface of the tubular body, activating the measuring means to measure the wall thicknesses of the tubular body corresponding to the points of external surface to which the distances were measured, calculating from the measured values thus determined the external cross-dimension of the tubular body by subtracting the distances from said points fixed in relation to said measuring means to said external surface from the distance between said two fixed points, calculating from the measured values thus determined the internal cross-dimension of the tubular body by subtracting the distances from said points fixed in relation to said measuring means to said external surfaces and said wall thicknesses from the distance between said two fixed points, and registering the values thus calculated.

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### Re. 30,089

### SELF-TAILING WINCH

**Maurice G. Declercq, 7144 S. Shore Dr., St. Petersburg, Fla. 33707**

**Original No. 4,026,525, dated May 31, 1977, Ser. No. 571,369, Apr. 24, 1975. Application for reissue Aug. 15, 1978, Ser. No. 933,968**

**Int. Cl.[2] B66D *1/30***

**U.S. Cl. 254—150 R** **22 Claims**

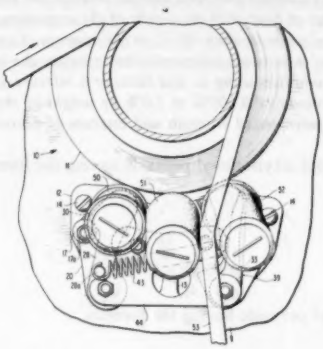
*3. A self-tailing winch assembly, comprising:*

*at least one drum mounted for rotation about a fixed axis extending from a base, said drum having an open unobstructed end, a flange adjacent said base, and a line-receiving portion disposed between said flange and said open end,*

*support means mounted adjacent said drum for supporting said winch assembly,*

*line grasping means to engage a line mounted on said support means and disposed in spaced-apart relation to said drum, said line grasping means including first and second grasping assemblies, said first grasping assembly including at least one roller,*

*said support means further including a carrier assembly moveably mounting said second grasping assembly,*



*drive means including means for drivingly interconnecting said flange and said one roller,*

*said carrier assembly further including biasing means operably engaging at least one of said grasping assemblies and normally biasing said one roller and said second grasping assembly into closer relationship with one another to releasibly grip said line extending therebetween from the drum whereby the line so gripped is drawn away from the drum upon rotation of the drum.*

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### Re. 30,090

### POLYMERIZATION OF VINYL CHLORIDE WITH BLENDS OF PEROXIDE INITIATORS

**Rupert E. Light, Jr., Williamsville, N.Y., assignor to Pennwalt Corporation, Philadelphia, Pa.**

**Original No. 3,736,306, dated May 29, 1973, Ser. No. 72,148, Sep. 14, 1970. Application for reissue Jun. 28, 1973, Ser. No. 374,446**

**Int. Cl.[2] C08F *4/38***

**U.S. Cl. 526—223** **17 Claims**

5. [The process of claim 1] *In a process for the suspension homopolymerization of vinyl chloride or the suspension copolymerization of vinyl chloride and vinyl acetate, wherein the vinyl chloride constitutes at least 50% by weight of the comonomers, at a temperature of not more than 70° C. in the presence of an initiating amount of a peroxide polymerization initiator, the improvement which comprises using as said initiator a mixture of peroxides in the amount of 0.005% to 1.0% by weight of the monomer(s) being polymerized* wherein said mixture of peroxides is a mixture of

(A) an acetyl alkylsulfonyl peroxide having the formula

$$RSO_2OOCCH_3$$

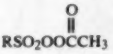
and

(B) a peroxy dicarbonate having the formula

wherein R is alkyl of 4–12 carbon atoms, cycloalkyl of 3–12 carbon atoms, or 1-adamantyl; $R_1$ is alkyl of 2–18 carbon atoms, cycloalkyl of 3–12 carbon atoms, or benzyl, *provided, however, that when $R_1$ is an alkyl group of 3 carbon atoms it is n-propyl;* and the weight proportions of component (A) to component (B) are from 1/0.2 to 1/4.

**10.** [The process of claim **1**] *In a process for the suspension homopolymerization of vinyl chloride or the suspension copolymerization of vinyl chloride and vinyl acetate, wherein the vinyl chloride constitutes at least 50% by weight of the comonomers, at a temperature of not more than 70° C. in the presence of an initiating amount of a peroxide polymerization initiator, the improvement which comprises using as said initiator a mixture of peroxides in the amount of 0.005% to 1.0% by weight of the monomer(s) being polymerized* wherein said mixture of peroxide is a mixture of

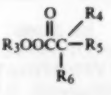
(A) an acetyl alkylsulfonyl peroxide having the formula



(B) a diacyl peroxide having the formula

and

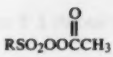
(C) a tertiary-alkyl neoacid peroxyester having the formula



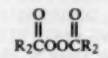
wherein R is alkyl of 4–12 carbon atoms, cycloalkyl of 3–12 carbon atoms, or 1-adamantyl; $R_2$ is primary alkyl of 2–17 carbon atoms; $R_3$ is tertiary alkyl of 4–8 carbon atoms; $R_4$, $R_5$ and $R_6$ are each alkyl of 1–6 carbon atoms; and the weight proportions of component (A) to component (B) are from 1/0.25 to 1/7 and of component (A) to component (C) are from 1/0.25 to 1/5.

**14.** [The process of claim **1**] *In a process for the suspension homopolymerization of vinyl chloride or the suspension copolymerization of vinyl chloride and vinyl acetate, wherein the vinyl chloride constitutes at least 50% by weight of the comonomers, at a temperature of not more than 70° C. in the presence of an initiating amount of a peroxide polymerization initiator, the improvement which comprises using as said initiator a mixture of peroxides in the amount of 0.005% to 1.0% by weight of the monomer(s) being polymerized* wherein said mixture of peroxides is a mixture of

(A) an acetyl alkylsulfonyl peroxide having the formula

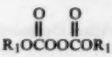


(B) a diacyl peroxide having the formula



and

(C) a peroxy dicarbonate having the formula



wherein R is alkyl of 4–12 carbon atoms, cycloalkyl of 3–12 carbon atoms, or 1-adamantyl; $R_1$ is alkyl of 2–18 carbon atoms, cycloalkyl of 3–12 carbon atoms, or benzyl; $R_2$ is primary alkyl of 2–17 carbon atoms; and the weight proportions of component (A) to component (B) are from 1/0.25 to 1/7 and of component (A) to component (C) are from 1/0.25 to 1/5.

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**Re. 30,091**

## AUTOMATICALLY GUIDING WORKPIECES THROUGH A MACHINE

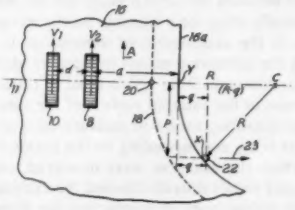
**Richard M. Richmond, Rushden, England, assignor to The Shoe & Allied Research Assoc., Kettering, England**

**Original No. 3,925,713, dated Dec. 9, 1975, Ser. No. 413,426, Nov. 7, 1973. Application for reissue Dec. 6, 1977, Ser. No. 858,463**

**Claims priority, application United Kingdom, Nov. 9, 1972, 51880/72**

**Int. Cl.**[2] **G05B** *19/32*

**U.S. Cl. 318—575** **61 Claims**



*60. Apparatus for guiding a workpiece through a machine to present to a work station successive portions of the workpiece located along a curved path, comprising:*

*a plurality of drive members engageable with the workpiece at spaced apart positions for feeding the engaged portions of the workpiece past the drive members to advance said successive portions of said workpiece through the work station in a substantially constant direction;*

*common means for driving said drive members at pre-determined relative velocities for feeding the workpiece through the machine, said common means being adjustable to vary the speed of feeding;*

*signal producing means for producing a control signal which is a function both of the speed of feeding and of the curvature of the path to be followed; and*

*means for superimposing on at least one of said drive members a variable additional velocity dependent upon said control signal for effecting steering of the workpiece.*

# PLANT PATENTS

## GRANTED SEPTEMBER 4, 1979

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

**4,458**

*HYDRANGEA QUERCIFOLIA*

**William Flemer, III, Princeton, N.J., assignor to Treesearch, Kingston, N.J.**

**Filed Oct. 18, 1978, Ser. No. 952,561**

**Int. Cl.[2] A01H** *5/00*

**U.S. Cl. Plt.—54** **1 Claim**

1. A new and distinct variety of *Hydrangea quercifolia* plant substantially as herein shown and described, characterized particularly as to novelty by the unique combination of very showy, white blooms, having abundant sterile florets usually about fifty to sixty in number, the blooms borne on strong, erect stems in upright non-pendant position, to a height of about one and one half meters, the low compact bush being generally hemispherical in overall appearance.

# PATENTS

## GRANTED SEP. 4, 1979

### ERRATA

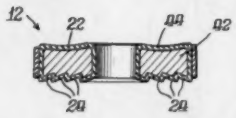
| For CLASS | See PATENT NO. |
|---|---|
| 414–749 | 4,166,543 |
| 414–747 | 4,166,544 |
| 414–263 | 4,166,546 |
| 215–256 | 4,166,552 |
| 252–008.1 | 4,166,743 |
| 435–028 | 4,166,763 |
| 435–119 | 4,166,764 |
| 435–026 | 4,166,765 |
| 435–021 | 4,166,766 |
| 435–007 | 4,166,767 |
| 435–286 | 4,166,768 |
| 252–373 | 4,166,830 |

# PATENTS

## GRANTED SEPTEMBER 4, 1979

## GENERAL AND MECHANICAL

**4,166,292**
**STRESS REINFORCED ARTIFICIAL JOINT PROSTHESES**
**Jack C. Bokros, Alpine, Calif., assignor to Carbomedics, Inc., San Diego, Calif.**
**Filed Sep. 8, 1977, Ser. No. 831,488**
**Int. Cl.[2] A61F *1/24***
**U.S. Cl. 3—1.91** **5 Claims**




1. A stress-reinforced joint prosthesis element for prolonged or permanent reconstructive implantation in a living body comprising

a dense isotropic graphite substrate of predetermined shape having a modulus of elasticity approximating the modulus of elasticity of natural bone, said substrate having a bone joining surface and an articulating joint surface adapted to receive substantial axial skeletal load forces tending to induce tensile strain in the joint prosthesis element transverse to the axial loading forces, and a perimeter surface adjacent said articulating joint surface.

a dense adherent isotropic vapor-deposited pyrolytic carbon coating on said isotropic graphite substrate, said vapor-deposited pyrolytic carbon coating having increased strength when placed in compression and presenting a dense, smooth, low friction wear surface at said articulating joint surface, and a smooth exterior surface at said perimeter surface, and

a metallic band in closely conforming compressional relationship against said smooth pyrolytic carbon coated perimeter surface adjacent said articulating joint surface with a compressive load from said band upon said perimeter surface which produces a strain at said perimeter surface not exceeding about 0.3% and having a modulus of elasticity at least about 5 times the modulus of elasticity of said carbon coated substrate, whereby said band functions to reduce said tensile strain induced upon application of said skeletal load forces, but said band being located intermediate said bone joining surface and said articulating wear surface such that said band does not carry any substantial portion of axial compressive load transmitted between said articulating wear surface and said bone joining surface upon application of said skeletal load forces.

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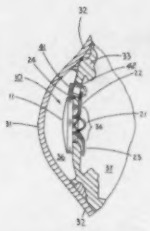
**4,166,293**
**INTRAOCULAR LENS IMPLANT**
**Aziz Y. Anis, 1530 Janssen Dr., Lincoln, Nebr. 68520**
**Filed Jun. 10, 1977, Ser. No. 805,390**
**Int. Cl.[2] A61F *1/16, 1/24***
**U.S. Cl. 3—13** **11 Claims**

1. A biologically inert artificial intraocular lens implant for aphakic correction comprising:

(a) a lens having a front face, a rear face and a outer peripheral edge;

(b) only four holding members attached to said lens including, a first, second and third U-shaped holding member, each said holding member having a looped portion between two free ends, each said holding member secured at said free ends to said rear face, with the free ends of adjacent loops disposed adjacent each other and with said loop portions extending generally radially of said lens and equally spaced from each other;

(c) a fourth U-shaped holding member having a looped



portion between two free ends, said fourth member secured to said peripheral edge in vertical alignment with said first U-shaped member and generally parallel to said first U-shaped member.

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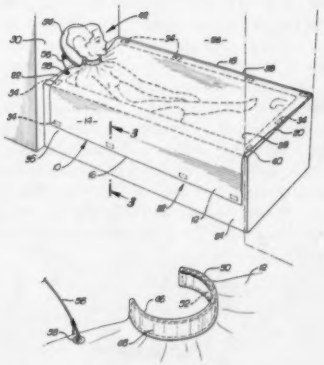
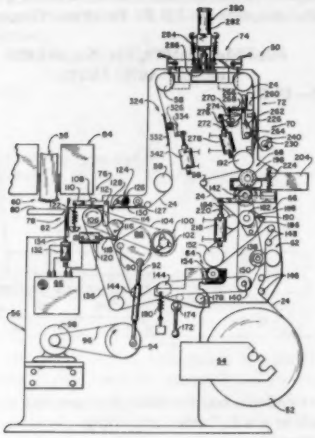
**4,166,294**
**BATHTUB SHROUD**
**Malissa McGowan, 1502 E. 126th St., Compton, Calif. 90222**
**Filed Apr. 21, 1978, Ser. No. 898,676**
**Int. Cl.[2] A61H *33/12, 33/06***
**U.S. Cl. 4—162** **2 Claims**



1. Bathtub shroud for retaining bath water heat about a person bathing, comprising a generally rectangular, thermally insulated, water impervious sheet material defining a shroud sized to overfit the tub opening in draped relation along one longitudinal edge of said tub, adherent fastening means distributively arranged on the shroud to self-adhere to the tub wall to perimetrically secure said shroud to the opposing tub walls beyond the tub opening in tub water covering relation, and collar means formed at one shroud lateral edge, said collar means being formed of a generally U-shaped spring steel member, said shroud defining a receiving pocket for said member normally encircling the neck of the bather in the worn condition of the shroud, for bath water heat retention about the bather's body.

edges, and a cutter mounted on the frame in the feed path between the printing mechanism and the lining platform for



successively cutting the printed strip transversely of its longitudinal axis into a series of integrated linings of preselected width having simulated headbands.

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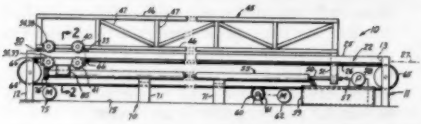
**4,166,301**
**APPARATUS FOR CLEANING PIPE**
**Eugene D. Smith, 3100 Hollins, Bakersfield, Calif. 93305**
**Filed May 26, 1978, Ser. No. 909,969**
**Int. Cl.[2] B08B** *9/02*
**U.S. Cl. 15—88** **14 Claims**



1. Apparatus for cleaning the inside and outside walls of a pipe having a longitudinal axis, said apparatus comprising:

a frame;

rail means on said frame having an axis and a top and bottom bearing surface;

carriage means mounted to said rail means for axial movement thereon, said carriage means engaging both the top and bottom bearing surfaces whereby to resist rotation around an axis oblique to the rail axis;

derrick means mounted to said carriage means and cantilevered axially beyond said carriage means;

a stinger mounted to said derrick extending axially and spaced laterally from said derrick;

said stinger being adapted to carry interior pipe cleaner means adjacent to its end closest to the carriage for cleaning said inside wall of said pipe;

pipe support means mounted to said frame to support a pipe to be cleaned in axial alignment with said stinger;

rotary means for rotating the pipe on said pipe support means;

external pipe cleaner means mounted to said carriage means to clean said outside wall of said pipe; and

carriage shifting means interlinking said frame and said carriage for shifting said carriage on said rail means whereby to move both of the pipe cleaner means along the pipe while the pipe rotates relative to them, whereby to treat the full length and circumference of said pipe, said rail means being of sufficient length that the stinger with the pipe cleaner means attached can be withdrawn from the pipe in order to place pipe to be cleaned on the pipe support means and to run the stinger and the interior pipe cleaner means into the pipe to clean the inside of the pipe and run the external pipe cleaner means along the outside of the pipe to clean the outside wall of said pipe.

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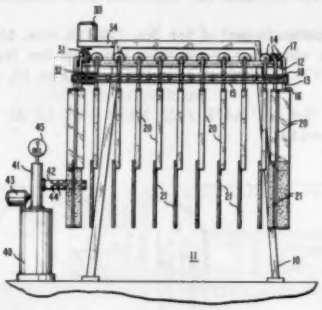
**4,166,302**
**AUTOMATIC VEHICLE DRYING APPARATUS**
**Hyun J. Kim, 4410 St. Barnabas Rd., Marlo Heights, Md. 20031**
**Filed Aug. 31, 1978, Ser. No. 938,339**
**Int. Cl.[2] B60S** *3/06*
**U.S. Cl. 15—97 B** **8 Claims**



1. A motor vehicle drying appartus for use in on automatic car wash system in which motor vehicles are moved along a defined path through a plurality of vertically hanging towels, said apparatus comprising a main frame assembly having an upper portion traversing the width of the motor vehicle path, rotating carriage means disposed and connected to said upper portion of the main frame for guiding and supporting the vertically hanging towels around said main frame in a defined path, drive means for rotating the carriage around said main frame, a plurality of water absorbing vertically hanging towels connected to said rotating carriage means adapted to be rotated around said main frame in the motor vehicle path, and towel dewatering means comprising a vacuum drying system consisting of a vacuum chamber, means for maintaining a vacuum in said vacuum chamber, and a suction tube having a plurality of ports in communication with said vacuum chamber and being disposed in the path of said vertically hanging towels as said towels are moved by said rotating carriage whereby said towels are dewatered by the suction ports of vacuum drying system.

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**4,166,303**
**DRY WIPING SYSTEM FOR AUTOMOBILES**
**Richard H. Fromme, Rancho Mirage, Calif., assignor to Daniel C. Hanna, Portland, Oreg.**
**Filed Nov. 11, 1977, Ser. No. 850,679**
**Int. Cl.[2] B60S** *3/06*
**U.S. Cl. 15—97 A** **17 Claims**

1. An automobile dry wiping apparatus for use in a mechanized car wash establishment through which automobiles are moved along a defined path, said apparatus comprising:

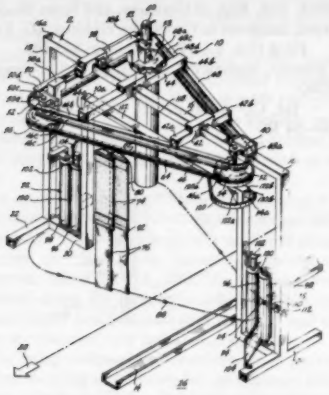
a plurality of elongated wiper strips;

elongated endless circulating carrier means;

individual mounting means for said strips, suspending said strips from said carrier means at successive locations along said carrier means;

means supporting, driving and guiding said carrier means to move in a defined substantially horizontal circuitous path overlying and extending transversely beyond opposite sides of said defined automobile path, those portions of

said circuitous path along which the wiper strips are positioned to move in wiping contact with an automobile advancing along its defined path being so oriented relatively as to advance said wiper strips with a component of motion that is directed opposite the advancement of the automobile.



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**4,166,304**

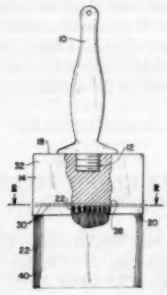
## PAINT BRUSH

**Francis X. Flynn, 1830 Harvey Ln., East Meadow, N.Y. 11554**

**Continuation-in-part of Ser. No. 760,632, Jan. 19, 1977, abandoned. This application Feb. 27, 1978, Ser. No. 881,571**

**Int. Cl.**[2] **A46B** *3/00*

**U.S. Cl. 15—191 R** **8 Claims**



**1.** A paint brush assembly comprising a head portion, a handle portion, said handle portion being removably affixed to said head portion, said head portion having a plurality of bristle brush tufts depending from a first portion of the surface of said head portion, said head portion having a second surface portion extending substantially parallel to the longitudinal axes of said plurality of bristle tufts, said first portion of said surface being adjacent and transverse to said second portion of said surface, one end of each of said bristle brush tufts being embedded in said head passing through said first portion, a first and a second plurality of holes, said first plurality of holes each extending parallel to one another, said second plurality of holes each extending parallel to one another, said first and said second plurality of holes extending transverse to one another, each of said first plurality of holes communicating to each of said second plurality of holes at said each of said one ends of said bristles, each of said first said plurality of holes communicating with said second portion at each of the ends of each of said first plurality of holes, each of said second plurality of holes communicating with said second portion at each of the ends of each of said second plurality of holes.

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**4,166,305**

## DEVICE FOR WASHING MACHINE PARTS

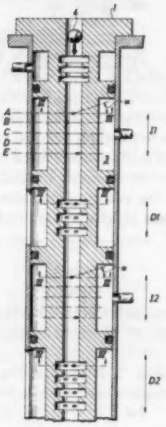
**Berth U. Gustafsson, Osterskar, Sweden, assignor to Projectus Industriprodukter Aktiebolag, Bromma, Sweden**

**Filed Dec. 9, 1977, Ser. No. 859,138**

**Claims priority, application Sweden, Dec. 10, 1976, 7613928**

**Int. Cl.**[2] **B08B** *3/02, 3/08, 3/10, 7/04*

**U.S. Cl. 15—302** **10 Claims**



**1.** An improved device for washing machine parts having finely worked external surfaces, comprising a treatment chamber disposed axially and symmetrically to an imaginary axis and having at the axial ends thereof an inlet and an outlet for introducing and removing said machine parts one after the other, at least one injection nozzle being provided for the injection of a solvent into the treatment chamber, under pressure, said nozzle being disposed at the treatment chamber wall in a washing portion of said treatment chamber adjacent the inlet thereof and being directed substantially tangentially along said wall as seen in a plane normal to said imaginary axis so as to cause a rotational flow of said solvent, and a draining section disposed in said washing portion between said injection nozzle and subsequent additional treatment portions of said treatment chamber, said draining section including at least one substantially annular draining groove formed in the chamber wall, and means defining outlet openings for the rotationally flowing solvent being disposed in said groove and being directed substantially tangentially so as to align with the flow direction of said solvent.

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**4,166,306**

## CURTAIN SUSPENSION ASSEMBLY

**Richard W. Janson, Box 8110, Canton, Ohio 44711**

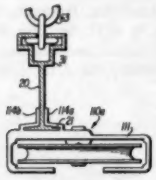
**Continuation of Ser. No. 734,106, Oct. 20, 1976, abandoned, which is a division of Ser. No. 617,508, Sep. 29, 1975, Pat. No. 4,014,071. This application Nov. 28, 1977, Ser. No. 855,266**

**Int Cl.**[2] **A47H** *15/00*

**U.S. Cl. 16—94 R** **11 Claims**

**6.** A traverse rod for supporting curtains and the like in combination with supporting structure and with pulley means which receives rope means to move curtains or the like carriers; the rod defining a groove which includes a slot which extends along its upper side, said groove having a width greater than the width of said slot; the supporting structure including a depending vertical part received in said slot and a horizontal part connected to said depending vertical part, said horizontal part received in said groove and having a width

greater than the width of said slot; said pulley means including a housing which carries at least one pulley, a vertical plate connected to said pulley extending upwardly from said housing, a horizontal plate integrally connected to said horizontal vertical plate and a support member depending from said



horizontal plate spaced from said vertical plate, said support member including a depending vertical portion received in said slot and a horizontal portion connected to said vertical portion, said horizontal portion received in said groove and having a width greater than the width of said slot; and means for securing said pulley means rigidly to said rod.

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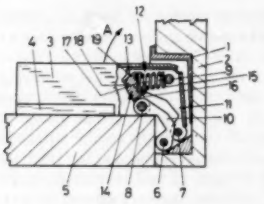
**4,166,307**

## HINGE

**Erich Röck, Höchst, and Bernhard Mages, Dornbirn, both of Austria, assignors to Julius Gesellschaft m.b.H., Hochst, Austria**

**Filed Feb. 2, 1978, Ser. No. 874,684**
**Claims priority, application Austria, Feb. 11, 1977, 910/77**
**Int. Cl.[2] E05D** *3/06*
**U.S. Cl. 16—163** **7 Claims**



1. A hinge comprising:

first and second hinge parts;

a quadrangular link mechanism connecting said first and second hinge parts so that said first hinge part is movable with respect to said second hinge part between a closed hinge position and an open hinge position, said link mechanism including a first hinge link having a first end pivoted to said first hinge part by a first axle and a second end pivoted to said second hinge part by a second axle, and a second hinge link having a first end pivoted to said first hinge part by a third axle and a second end, said second hinge link being pivoted at a position between said first and second ends thereof to said second hinge part by a fourth axle, said second end of said second hinge link having a stop;

a tipping lever pivotally mounted about said second axle, said tipping lever having thereon first and second pressure faces; and

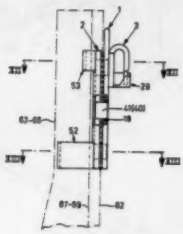
spring means, having a first end abutting said fourth axle and a second end abutting said tipping lever, for urging said tipping lever into contact with said stop, such that when said first hinge part is in said closed hinge position said first pressure face is urged against said stop and creates a torque on said second hinge link, and such that when said first hinge part is in said open hinge position, said second pressure face is urged against said stop without creating a torque on said second hinge link.

**4,166,308**

## FOLD OR PLEAT FIXING ARRANGEMENT FOR CURTAINS OR DRAPES

**Rudolf Schmitz, Kastanienbaum, Switzerland; Hermann Pape, Laggenbeck, Fed. Rep. of Germany, and Hans Stoecker, Wil, Switzerland, assignors to Gardisette Holding AG, Switzerland**

**Filed Oct. 17, 1977, Ser. No. 843,042**
**Claims priority, application Fed. Rep. of Germany, Jul. 16, 1977,** *2732242*
**Int. Cl.[2] A44G** *21/00;* **A47H** *13/14*
**U.S. Cl. 24—84 R** **16 Claims**



1. An arrangement for fixing folds in curtains or drapes, the arrangement comprising:

a retaining plate member,

a fold clasp member,

means for detachably elastically locking said fold clasp member to said retaining plate member, said elastic locking means being provided on a backside of said fold clasp member and including locking members arranged substantially centrally of said fold clasp member and elastically deformable portions provided on respective sides of said locking members, said portions including outer longitudinal sides which extend in proximity of the retaining plate member when said fold clasp member and said retaining plate member are in a locked condition, and

at least two mutually aligned folding clamping means provided on a front side of said fold clasp member for receiving at least one fold of the curtain or drape and for fixing the fold thereat.

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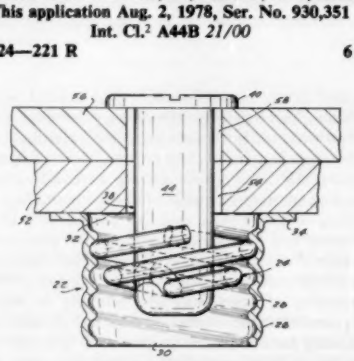
**4,166,309**

## VARIABLE HEIGHT RECEPTACLE

**Peter Schenk, West Islip, N.Y., assignor to Dzus Fastener Co., Inc., West Islip, N.Y.**

**Continuation of Ser. No. 780,310, Mar. 23, 1977, abandoned. This application Aug. 2, 1978, Ser. No. 930,351**
**Int. Cl.[2] A44B** *21/00*
**U.S. Cl. 24—221 R** **6 Claims**



1. A variable height receptacle adapted to be mounted on one of two members to be fastened and to be removably coupled with a stud mounted on the other of the two members to be fastened comprising:

a tubular housing having an opening in at least one end and a threaded inner surface and surfaces thereon for attachment to the one member;

a double wound spring in the housing in engagement with the threaded surface whereupon relative rotation between the spring and the housing will shift the spring along the threaded surface;

the double wound spring having been wound from a single strand of material bent into a U-shape forming a cross member at one end of the U-shape with two prongs one extending from each end of the cross member portion and the prong having been thereafter wound around a mandrel in the same direction into coils intertwined with one another;

the cross member portion of the spring forming a diametrically extending resilient bar to provide a cam follower for engagement with a spiral cam slot on a stud coupled with the other member to be fastened whereupon relative movement therebetween with the spring having been preshifted along the threaded surface in the housing to a predetermined position will shift the stud and spring between the fastened and unfastened positions;

the spring being under partial compression in position in the threaded housing so that it exerts an outward force on the housing which facilitates frictional engagement between the spring and housing and assists in retaining the spring in position in the housing;

the spring being wound so that engagement with the bar and rotation in one direction will tend to compress the spring inward to facilitate mounting of the spring in the housing whereupon release thereof will cause the spring to tend to expand and engage the housing under partial compression and rotation of the spring in the other direction will tend to expand the spring into tighter frictional interengagement with the housing when mounted therein to assist in retaining the spring in position in the housing; and

the spring enabled to be first positioned in the tubular housing so that engagement with the stud and rotation thereof will rotate the spring and shift the spring to a second position in which the spring is fastened with the stud whereupon further rotation in the fastening direction is prevented by tight interengagement between the receptacle, stud and two members being fastened but rotation in the unfastening direction is permitted to free the stud from the spring and permit unfastening of the two members.

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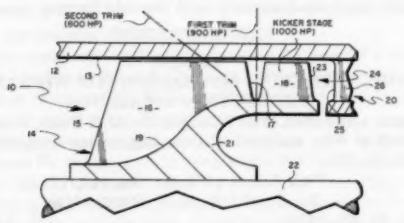
## 4,166,310
## METHOD OF ALTERING AN AXIAL IMPELLER/STATOR VANE COMBINATION

**Kurt Rothe, Pacific Palisades; Raymond B. Furst, Northridge, and Charles E. Nielson, Canoga Park, all of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.**

**Continuation-in-part of Ser. No. 803,713, Jun. 6, 1977, abandoned. This application May 2, 1978, Ser. No. 902,149**
**Int. Cl.[2] B21H** *7/16*
**U.S. Cl. 29—23.5** **6 Claims**




1. A method of preventing cavitation damage and loss of pump efficiency to an axial waterjet pump operating substantially at a constant RPM with a fixed stator vane housing section when the engine horsepower range is changed comprising the steps of:

varying the length and therefore area of an impeller blade by a predetermined amount to obtain the correct velocity, and varying the blade angle without changing the direction of flow entering the fixed stator section to maintain the proper stator vane inlet angle for a predetermined change in engine horsepower range, while maintaining the value of $\phi/\psi$ as a constant, where $\phi$ is flow coefficient and $\psi$ is the head coefficient.

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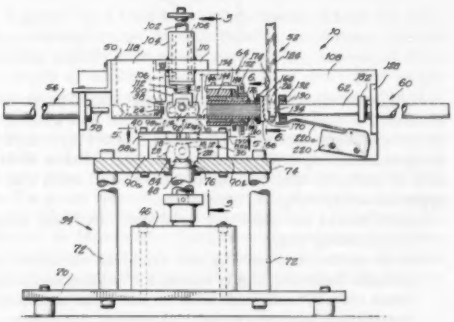
## 4,166,311
## APPARATUS FOR TRIMMING A CABLE TERMINAL LUG AND ASSEMBLING A FASTENER BOLT THEREON

**Douglas K. Lindstrand, Elburn, Ill., assignor to Belden Corporation, Geneva, Ill.**

**Filed May 8, 1978, Ser. No. 903,507**
**Int. Cl.[2] H01R** *43/00*
**U.S. Cl. 29—33 A** **11 Claims**



1. Apparatus for trimming a cable terminal lug to a predetermined size, inserting a bolt through a bore in the lug and applying a nut to the bolt, said terminal lug defining a first bore therethrough adapted to receive a battery post or the like therein, and having a second bore spaced from and generally transverse to the axis of said first bore and adapted to receive said bolt therethrough, said machine comprising, in combination, base means defining first and second stations, said first station being adapted to receive a cable terminal lug therein with said first bore disposed in predetermined position, trim die means supported by said base means and defining a shearing edge of predetermined configuration, means cooperable with said terminal lug when received within said first station to move said lug to said second station during which said lug cooperates with said trim die means to trim said lug to said predetermined configuration, first supply means for sequentially supplying bolts to said second station with the axes of said bolts substantially axially aligned with said second bore of a terminal lug when disposed at said second station, second supply means operative to sequentially supply nuts to said second station, first means cooperable with said first supply means and operable to move a bolt from said first supply means to a position wherein a threaded shank of the bolt passes through said second bore in said terminal lug, second means cooperable with said second supply means and operative to advance a nut from said second supply means to a position substantially axially aligned with and juxtaposed to the end of a threaded shank inserted through said second bore, and means for effecting rotation of said advanced nut in a direction to effect threaded engagement thereof with the threaded shank of said bolt.

## 4,166,312
## APPARATUS FOR RE-FORMING AN AXIAL LEAD OF AN ELECTRONIC COMPONENT INTO U-SHAPE AND AFFIXING SAID COMPONENT TO ELONGATED SUPPORT TAPE

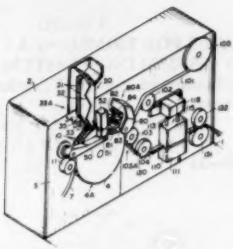
**Kotaro Harigane; Akihiro Kato, and Kenji Fujita, all of Tokyo, Japan, assignors to Tokyo Denki Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Sep. 16, 1977, Ser. No. 833,945**

**Claims priority, application Japan, Sep. 17, 1976, 51/110707; Jun. 7, 1977, 52/73267[U]**

**Int. Cl.[2] B23P** *23/04;* **B21D** *1/00, 1/04*

**U.S. Cl. 29—38 C** **15 Claims**



1. An apparatus for re-forming an axial lead of an axial-lead electronic component into a U-shaped lead and affixing said electronic component to an elongated support tape, each said component having a body and first and second axial leads and each of said axial leads having an inner and an outer end, said apparatus comprising, in combination,

supply means for supplying axial-lead electronic components one by one;

transfer means for receiving said axial-lead electronic components from said supply means, for holding said components only by said inner ends of said axial leads and for transferring same to a re-forming position and thence to an affixing position without applying stress to said body, said transfer means including support means for supporting an elongated support tape and having an axis of rotation;

re-forming means at said re-forming position for re-forming said first axial lead of said axial-lead electronic component into a U-shaped lead, said re-forming means including a bending arm rotatably along a front surface of said transfer means, a bending pin slidably supported by said bending arm, a bending cam for operating said bending arm, a re-forming arm movable in the axial direction of said transfer means, a re-forming pin slidably supported by said re-forming arm and a re-forming cam for operating said re-forming arm; and

affixing means at said affixing position for affixing said electronic component to said elongated support tape.

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## 4,166,313
## NUCLEAR FUEL ELEMENT NUT RETAINER CUP TOOL

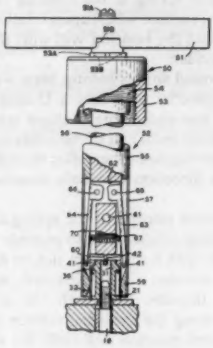
**Lewis A. Walton, Lynchburg, Va., assignor to The Babcock & Wilcox Company, New York, N.Y.**

**Division of Ser. No. 601,000, Aug. 1, 1975, Pat. No. 4,036,692. This application Apr. 22, 1977, Ser. No. 790,116**

**Int. Cl.[2] B23P** *11/00;* **B25B** *27/00*

**U.S. Cl. 29—243.5** **5 Claims**

1. A tool for threading and unthreading a slotted nut that is received within a deformable nut locking and retaining cup comprising: an axially movable outer sleeve, an inner shaft centrally disposed within the outer sleeve, means engaging the outer sleeve for axially moving the outer sleeve relative to the inner shaft, means engaging the inner shaft and outer sleeve for jointly rotating the inner shaft and the outer sleeve, a working end on the inner shaft for engagement within the slot on the nut such that the nut may be threaded or unthreaded, at least one locking tooth disposed within the outer sleeve pivotally connected to the inner shaft and in engagement with the outer



sleeve for deforming the cup in sesponse to axial movement of the outer sleeve relative to the inner shaft.

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## 4,166,314
## MAGNETICALLY ACTUATED NEEDLE PRINTING HEAD AND METHOD OF MANUFACTURE

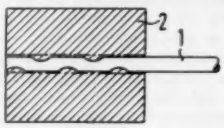
**Rudolf Rekewitz, Weidach, and Peter Kuelzer, Munich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany**

**Filed Mar. 10, 1977, Ser. No. 776,266**

**Claims priority, application Fed. Rep. of Germany, Mar. 24, 1976, 2612585**

**Int. Cl.[2] B21K** *25/00*

**U.S. Cl. 29—517** **4 Claims**




1. The method of manufacturing a mosaic needle printing head needle-armature assembly which comprises the steps of providing a ferromagnetic armature mass, providing a substantially cylindrical bore in said mass, providing a substantially cylindrical printing needle, coining an end portion of the needle to provide radially offset surface sections, inserting the end of the needle into the bore, cold forming the armature mass, radially moving material of the mass by said cold forming to constrict the bore to a point where the bore walls are radially flowed into substantial mating surface circumferential engagement with the length of the needle received in the bore wherein the external dimensions of the armature mass are finally sized simultaneously with the cold forming operation.

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## 4,166,315
## WIRE GATHERING MECHANISM FOR WIRE LEAD PRODUCTION APPARATUS

**Ragnar Gudmestad, West Allis, and Gerald E. Blaha, Waukesha, both of Wis., assignors to Artos Engineering Company, New Berlin, Wis.**

**Filed Jun. 5, 1978, Ser. No. 912,717**

**Int. Cl.[2] H01R** *43/04;* **H02G** *1/12*

**U.S. Cl. 29—564.4** **9 Claims**

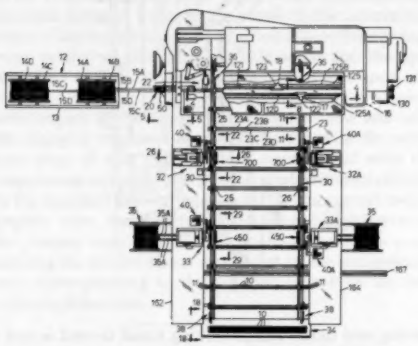
1. Apparatus for high-speed production of sets of accurately and identically sized wire leads comprising:

conveyor clamp means including a body and a relatively movable jaw for releasably gripping a set of wire segments

arranged in parallel spaced apart relationship in a common generally horizontal plane;

at least one processing mechanism having means for performing a work operation on said set of wire segments;

conveyor means for advancing said conveyor clamp means and moving said set of wire segments therein through said processing mechanism;



and a wire gathering mechanism disposed between said clamp means and said processing mechanism, said processing mechanism having means for accurately guiding the ends of said set of wire segments relative to said processing mechanism and for holding the ends of said set of wire segments against displacement during the work operation thereon.

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**4,166,316**

**PIN INSERTION METHOD AND APPARATUS**

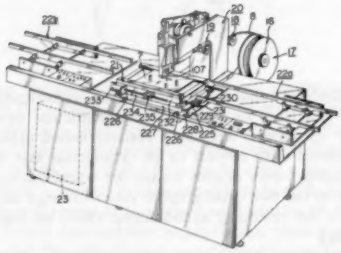
**Yoshihiko Misawa; Kazuhiro Mori, and Shigeru Araki, all of Katano, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Jan. 3, 1978, Ser. No. 866,368**

**Claims priority, application Japan, Jan. 12, 1977, 52-2760**

**Int. Cl.[2] H05K** *13/04*

**U.S. Cl. 29—626** **25 Claims**



1. A pin insertion apparatus comprising

a stock station for storing a pin blank in the form of a wire, pin blank feed means for intermittently extracting said pin blank from said pin blank stock station and feeding at a predetermined feed or pitch,

notching means operating in synchronism with said feed means for notching or forming notch-like recesses in said pin blank, cutting or shearing means for receiving the leading end of said pin blank, moving so as to cut or shear a pin from said pin blank at the notched portion thereof and orienting said pin in the pin insertion direction,

pin insertion means for pushing said pin toward a board or the like, thereby inserting said pin into a predetermined aperture in said board or the like, and

board positioning means for supporting said board or the like.

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**4,166,317**

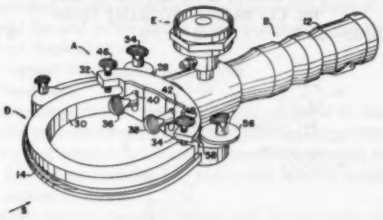
**TRIMMING KNIFE**

**Louis A. Bettcher, Amherst, Ohio, assignor to Bettcher Industries, Inc., Birmingham, Ohio**

**Filed Oct. 17, 1977, Ser. No. 842,584**

**Int. Cl.[2] B26B** *29/02*

**U.S. Cl. 30—276** **4 Claims**



1. A gauge for a hand-held and manipulated knife for trimming a comistable product, such as, meat, and having a handle projecting radially from an annular ring-like member of short axial length in which a ring-like blade of short axial length having an annular cutting edge at one end is rotatably supported and power driven, said gauge assembly comprising an annular member having a base part adapted for connection to the knife and a flexible ring-like gauge part proper integral with said base part but separated therefrom at one end and when the gauge assembly is connected to the knife concentric with the blade of the knife and conforming generally to the interior of the blade with a space between said gauge assembly and the blade of the knife, and means for adjusting said base part of said gauge assembly axially of the blade of the knife to which said gauge assembly is connected.

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**4,166,318**

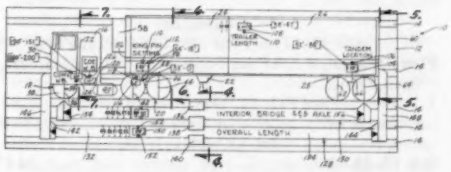
**TRUCK-TRAILER CALCULATOR**

**Donald G. Engstrom, 2846 S. 163rd Plz., Omaha, Nebr. 68130**

**Filed Jun. 16, 1978, Ser. No. 915,973**

**Int. Cl.[2] G06G** *7/48*

**U.S. Cl. 33—1 G** **18 Claims**



9. A tractor trailer calculator comprising

a support means,

elongated track means on said support means, said track means including a plurality of longitudinally extended and vertically spaced apart tracks,

tractor and trailer elements mounted on said tracks for sliding movement of at least one element relative to the other,

said tractor element including a steering axle indicator, a tandem axle indicator and a fifth wheel indicator, said indicators being supported on said tracks for adjustable longitudinal movement relative to one another, and

said trailer element including forward and rearward portions, a king pin indicator adapted for vertical alignment with said fifth wheel indicator and a tandem axle indicator positioned rearwardly of said king pin indicator, said portions and indicators of said trailer element being opera-

tively supported on said tracks for adjustable longitudinal movement relative to one another, and

measuring means operatively associated with said portions and indicators for longitudinally measuring said elements at various relativel positions therefor.

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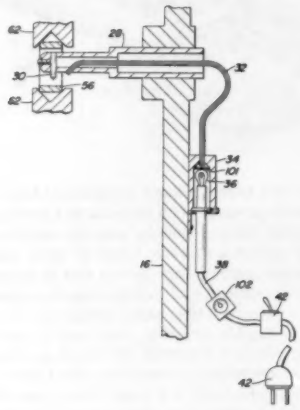
**4,166,319**

## ILLUMINATED ENGRAVING MACHINE

**Edward D. Rosenberg, Levittown, N.Y., assignor to New Hermes, Incorporated, New York, N.Y.**

**Filed Dec. 5, 1977, Ser. No. 857,328**
**Int. Cl.[2] B43L *13/10*; B23Q *35/04***
**U.S. Cl. 33—24 B** **9 Claims**




1. Apparatus comprising a frame supporting a tool holder, means on said frame for supporting a circular object to be engraved, said tool holder supporting an engraving tool for engraving on the inner periphery of a circular object such as a ring or band, the improvement comprising a fiber optic bundle supported by said tool holder and having one end exposed adjacent the engraving tool, said tool holder being hollow, at least a portion of said fiber optic bundle extending through the hollow interior of said tool holder, and a source of illumination communicating with the other end of said bundle.

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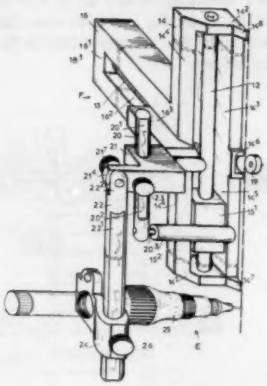
**4,166,320**

## APPARATUS FOR TRACING ELLIPSES

**Pierre Magnat, 1 Allee des Petits Pres, 78130 Elancourt, Yvelines, France**

**Filed Feb. 21, 1978, Ser. No. 880,001**
**Claims priority, application France, Feb. 21, 1977, 77 05493**
**Int. Cl.[2] B43L *11/04***
**U.S. Cl. 33—31** **14 Claims**

1. Apparatus for tracing elliptical curves comprising a T-shaped support member having perpendicular longitudinal and transverse branches and constituted as a one-piece molded body, said T-shaped member including means in said longitudinal branch for providing point support on a tracing surface on which a curve is to be reproduced, means including two sliders respectively supported in the branches for sliding movement therein, coupling means coupled to said sliders for correlating movement thereof in said branches, and tracer means supported by said coupling means for tracing a curve on the surface in accordance with the movement of the sliders, said branches of the T-shaped member having respective recesses and including two support shafts each secured in a fixed position in a respective recess and slidably supporting a respective slider, the recess in one of said branches extending along said one branch at the surface thereof perpendicular to the tracing surface, the recess in the other of the branches extending along said other branch at the upper surface thereof parallel to the tracing surface, said longitudinal and transverse recesses re-



ceiving said sliders and permitting travel thereof in said recesses on said support shafts.

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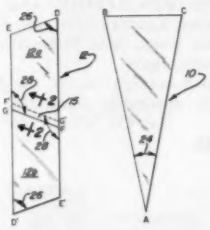
**4,166,321**

## ORTHOGRAPHIC TO AXONOMETRIC PLOTTING APPARATUS

**Brian J. Monahan, 28895 Cragmont Dr., Evergreen, Colo. 80439**

**Filed May 16, 1977, Ser. No. 796,891**
**Int. Cl.[2] B43L *13/14***
**U.S. Cl. 33—432** **14 Claims**




1. In drafting apparatus for producing an axonometric view of an object from two adjacent perpendicular orthographic views of the object, wherein a predetermined primary guide angle defined with respect to an orthogonal axis of the two orthographic views orients means for transforming common points from the two orthographic views to single axonometric points on the resulting axonometric view, an improvement comprising:

main plotting means comprising relatively straight base, reference and plotting edges, the reference and plotting edges extending in respective nonparallel and intersecting relation, the reference and plotting edges extending at the same acute angle with respect to the base edge, and extensions along the reference and plotting edges intersecting to define a predetermined acute apex angle at a point remote from the base edge; the value of said apex angle being predetermined such that upon said main plotting means being positioned with respect to the first orthographic view with the base edge extending at the primary guide angle with respect to one orthogonal axis of the two orthographic views and with the reference edge extending in predetermined relation to the common point on the first orthographic view, the plotting edge defines a linear extension along which the single axonometric point corresponding to the orthographic point is located; and

auxiliary plotting means comprising at least one relatively straight longitudinal side edge, engaging means for engaging the reference edge of said main plotting means and for extending the longitudinal side edge at a predetermined intersecting angle with respect to the reference edge of said main plotting means upon engagement, and longitudinal plotting means for defining a linear extension parallel to the longitudinal side edge along which the single axonometric point is located; the value of the intersecting angle of the longitudinal side edge with the reference edge being related to the primary guide angle and the apex angle and also being predetermined such that upon said auxiliary plotting means being simultaneously positioned with respect to the second orthographic view and with the engaging means in engaging relation with the reference edge of said main plotting member and with the longitudinal side edge extending in predetermined relation to the common orthographic point on the second orthographic view, the longitudinal plotting means intersects the plotting edge of said main plotting means at a point defining the single axonometric point on the axonometric view corresponding to the common points on the two orthographic views.

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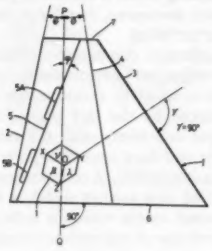
**4,166,322**

## RULERS FOR MAKING AXONOMETRIC PROJECTION DRAWINGS

**Akira Hirano, 178, Shin-Karasuma-Kashiramachi, Kamigyoku, Kyoto City, Kyoto, Japan**

**Filed Sep. 9, 1977, Ser. No. 831,997**
**Int. Cl.[2] B43L *13/14***
**U.S. Cl. 33—432** **15 Claims**



1. A ruler for use in making axonometric projection drawings having three main axes, said ruler comprising a transparent plate having a base edge, a first edge means forming a predetermined angle with respect to said base for alignment in parallel with one axis of the three main axes; a second edge means forming a second predetermined angle with respect to said base for alignment at an angle $\gamma$ with another of the three main axes; a first standard line means on said plate forming an inversion angle $2\theta$ with respect to said first edge; and a second standard line means on said plate forming an angle $\phi$ with respect to the bisector of the angle $2\theta$.

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**4,166,323**

## GEAR TESTER FOR PROFILE AND LEAD TESTING

**Oskar Maag, Zurich, Switzerland, assignor to Maag Gear-Wheel & Machine Co. Ltd., Zurich, Switzerland**

**Filed Sep. 13, 1974, Ser. No. 505,908**
**Claims priority, application Switzerland, Sep. 14, 1973, 13255/73; Fed. Rep. of Germany, Dec. 28, 1973, 2364916**
**Int. Cl.[2] B23Q *17/16*; G01B *5/20***
**U.S. Cl. 33—179.5 R** **7 Claims**

1. Apparatus for testing the contour of a gear tooth flank comprising:

means fixedly mounting a gear containing said tooth flank to be tested and holding said gear stationary during testing of said tooth flank;

probe means adapted to be moved along said flank in contact therewith while said gear is held stationary for sensing the contour of said flank;

a support mechanism having said probe means operatively associated therewith for moving said probe means along a predetermined path in accordance with a control program determining said path;

control means actuating said support mechanism to move said probe means along said path, said control means including means defining a predetermined path of movement for said probe means corresponding with a standard tooth flank contour;

said support mechanism comprising

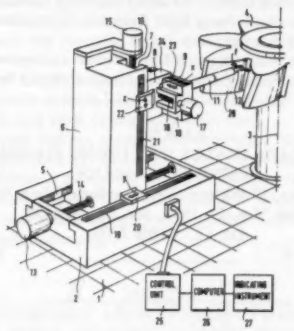
a fixed base,

a first support member displaceably mounted on said base for movement relative thereto in a first direction,

a second support member displaceably mounted on said first support member for movement relative thereto in a second direction,

a third support member having said probe means thereon displaceably mounted relative to said second support member for movement in a third direction,

said first, said second and said third directions of movement of said first, said second and said third support



members, respectively, defining a three dimensional spatial co-ordinate system through which said probe means moves during testing of said gear flank, and

drive means responsive to said control means for individually moving each of said first, said second and said third support members, respectively, in said first, said second and said third directions continuously during testing of said tooth flank simultaneously therewith thereby to effect movement of said probe means along said predetermined path defined by said control program and within said three dimensional spatial co-ordinate system while said gear is held stationary;

resilient means acting between said probe means and said third support member to maintain said probe means in engagement with said stationary gear tooth flank, said probe means being displaceable against the force of said resilient means relative to said third support member in a direction transverse to said tooth flank;

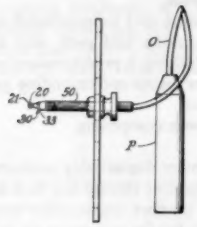
sensing means responsive to displacement of said probe means relative to said third support member; and

evaluation means operatively associated with said control means and said sensing means for determining deviations in movement of said probe means from said predetermined path corresponding with said standard tooth flank contour in order to determine thereby deviations from the standard tooth flank contour in the tooth flank being tested.

## 4,166,324
## ILLUMINATED SIGHT

Glenn M. Carollo, 2480 He-Nis-Ra La., Green Bay, Wis. 54303, and Thomas M. Canadeo, 1023 Bluebird St., DePere, Wis. 54115

Filed Jan. 12, 1978, Ser. No. 868,901
Int. Cl.[2] F41G 1/34, 1/46
U.S. Cl. 33—241 1 Claim




1. An improved sight assembly comprising:
(a) a light source:
(b) a transparent member having as an integral part thereof a bead portion, said bead portion having surfaces for reflecting light received from said light source and for refracting said reflected light whereby an illuminated sight pattern is formed on said refracting surface;
(c) means for conducting light from the light source to the transparent member; and
(d) means for mounting said light source, transparent member and conducting means to an instrument to be sighted.

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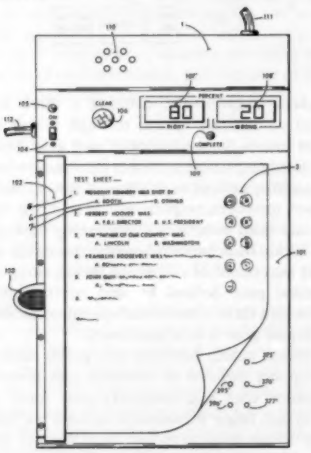
## 4,166,325
## DIDACTIC APPARATUS INCLUDING HANDHELD RESPONSOR MEANS

Harold J. Weber, 20 Whitney Dr., Sherborn, Mass. 01770

Filed Mar. 22, 1978, Ser. No. 889,490
Int. Cl.[2] G09B 7/06
U.S. Cl. 35—9 C 14 Claims




1. Didactic means for providing a learning experience, comprising:
a. a first apparatus consisting of at least one interrogatory document containing a first instruction means and a second instruction means, wherein said first instruction consists of at least one examinative statement together with at least two different replication selections, wherein further said second instruction consists of indicia denotive of the correct replication selection for the said examinative statement;
b. a second apparatus means consisting of:
ba. support conformation means for accepting singular placement of the said first apparatus interrogatory document and thereby positioning the said first instruction means for easy viewing by an operator;
bb. receptor means contained integral with the said support means, whereby the said receptor is cooperatively positioned in relation to the said, thereupon placed, interrogatory document second instruction means so as to interact with the said indicia in a manner operative to produce a denotive first signal at an output means;
bc. a second signal generative means for producing a succession of timely coded signals at a plurality of outputs;
bd. a plurality of second signal coupling devices cooperatively coupled to the said second signal generative means plural outputs;
be. an arrangement of said coupling devices which is purposefully located in the said support means as to underlie, or be subjacent to, the area upon the said first apparatus interrogatory document whereon the said replication selections are positioned and further wherein the individual coupling mode for each of the said coupling devices is particularly caused to fall upon the reverse, or back, side of and extend through the said first apparatus document;
c. a third apparatus consisting of a portable coupling means, cooperatively interconnected with the said second apparatus means, which may be selectively positioned by an operator so as to intercept and be mutually interactive with any one of the said second coupling devices, wherein the said coupling mode is caused to pass through the said first apparatus document, thereby producing a third signal at an output terminal;
d. a fourth apparatus comparative means consisting of an ordered arrangement of electrical devices connected with and operative so as to combine the said denotive first signal produced by the said second apparatus receptor means output coactively with the said third signal produced by the said third apparatus portable coupling means output so as to produce, in combination with the cooperatively coupled said second signal, a fourth signal at an output terminal means which is indicative of the exactitude of the choice of said operator's placement of the said third apparatus portable coupling means in relation to any one of the said various second apparatus second signal coupling means, the effects of which have been caused to pass through the said first apparatus interrogatory document replication selections associated with the thereupon appearing first instruction means.

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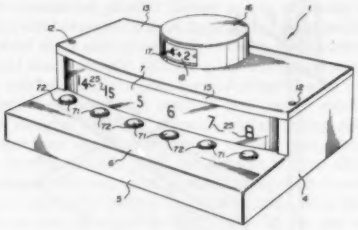
## 4,166,326
## EDUCATIONAL TEACHING AID

Chris Schramm, Box 1200, Drayton Valley, Alberta, Canada

Filed Apr. 25, 1978, Ser. No. 899,740
Claims priority, application Canada, May 12, 1977, 278279
Int. Cl.[2] G09B 3/10
U.S. Cl. 35—9 A 7 Claims

1. A teaching apparatus including a casing; a first tape having a set of questions thereon in said casing; a second tape having answers to each of said questions in said casing; a first window in said casing for viewing one of said questions at a time; a second window in said casing for viewing a plurality of said answers at the same time, one of said answers being the correct answer to said question; means for moving said first tape past said first window to randomly display another of said questions, the answer to which is visible in said second window; a plurality of tape actuation means equal in number to the answers visible through said second window at any one time extending out of said casing and visibly associated with each of

said answers; and linkage means adapted to connect one of said tape actuation means to said tape moving means only when the



tape actuation means associated with the correct answer is operated.

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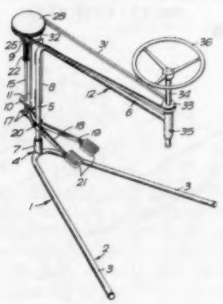
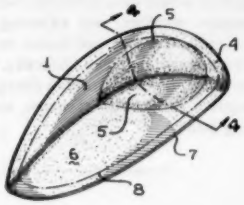
**4,166,327**
**COORDINATION PRACTICE DEVICE**
**Charles Wressell, 115 Alexandra Ter., Lincoln, England**
**Filed Oct. 28, 1977, Ser. No. 846,531**
**Int. Cl.[2] G09B *9/04***
**U.S. Cl. 35—11 R** **9 Claims**



1. A driving practice device, comprising:
a base,
a table carried by the base and having a flat upper surface, said table being tiltable about a substantially horizontal axis and rotatable about an axis substantially perpendicular to the table;
a manually operable steering wheel carried by said base and connected to said table such that the manual rotation of said wheel effects rotation of said table about said axis;
two substantially vertical push-rods which act on an undersurface of said table, one on either side of said axis of rotation of the table, to apply opposite turning moments to said table;
two foot-operable levers pivotally carried by said base, one end of each of which acts on a respective push-rod to force it upwards in response to pressure on the opposite end of said lever, to tilt said table; and
a movable object which can be placed on said flat upper surface for sliding or rolling movement along it, operation of said steering wheel and said foot-operable levers to rotate and tilt said table controlling the speed and direction of movement of said object relative to said surface.

**4,166,328**
**SHOE REPAIR DEVICE**
**James C. Hamilton, 6307 Valley Rd., Bethesda, Md. 20034**
**Filed Mar. 28, 1977, Ser. No. 781,568**
**Int. Cl.[2] A43B *13/22, 5/00***
**U.S. Cl. 36—72 R** **7 Claims**



1. A device for covering a worn area on a shoe comprising
an opened topped member of flexible material having a side wall and a bottom member lying in a plane generally at right angles to said side wall,
said side wall having an upper edge and extending from a first region of the shoe intended to lie under the ball of the foot of the foot of the wearer and terminating at a second region adjacent the longitudinal center of the front of the shoe,
said side wall having a generally straight section along the side of the shoe and a section of increasing curvature adjacent the intended location of the big toe of the wearer whereby the curvature of said side wall conforms to the side of the shoe between said first and second regions,
said bottom member having an outer edge extending between said ends of said side wall, and
said device having a region of maximum thickness in the region of said device intended to lie both under the big toe and forward of the big toe of the wearer of the shoe,
said device tapering from said maximum thickness to a lesser thickness at said upper edge, said first and second regions and said outer edge.

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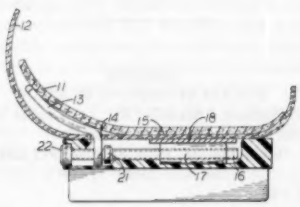
**4,166,329**
**ADJUSTABLE ARCH SUPPORT FOR SHOES**
**Charles A. Herbig, 680 Jackson St., Lot 16, Hillsdale, Ill. 61257**
**Filed Oct. 10, 1978, Ser. No. 949,994**
**Int. Cl.[2] A43B *3/26***
**U.S. Cl. 36—97** **2 Claims**



1. An adjustable arch support for a shoe comprising:
an arch-support member having an outer edge conforming quite closely over an outer edge of an insole of said shoe and having an upper surface extending from said outer edge inwardly to an inner edge over an inner edge of said insole, said inner edge of said arch-support member curving gradually to form an arch to fit within the arch of a foot, said arch-support member being movable in height within said shoe according to the requirement for support by a user,
said shoe having an insole with an aperture therethrough substantially directly below a central portion of said arch-

support member, an adjusting lever having an upper end above said insole to contact a lower surface of said central portion of said arch of said arch-support member, said adjusting lever extending downwardly from said upper end through said aperture to a lower end terminating a short distance below said insole,

a plate secured to said shoe to extend over an area below said arch-support member, and adjusting means connected between said plate and said lower end of said adjusting lever to move said lower end laterally, said adjusting lever being pivoted at said aperture to change the height of said arch-support member in response to operation of said adjusting means.

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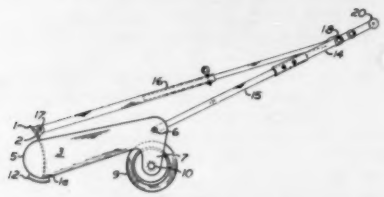
**4,166,330**
**HAND SNOW PLOW**
**Kenneth R. Flick, 1533 E. 20th St., Erie, Pa. 16510**
**Filed Mar. 6, 1978, Ser. No. 883,586**
**Int. Cl.[2] E01H *5/02***
**U.S. Cl. 37—53** **4 Claims**



1. A hand snow plow comprising an inverted U shaped frame, a pair of stub axles respectively on one and the other of the lower ends of the sides of the U, a pair of wheels respectively on one and the other of said axles, a handle fixed to and extending rearward from the top of the U, side plates extending forward in continuation of the sides of the U, a blade extending between and having opposite ends fixed to the forward ends of said side plates, the forward ends of the side plates extending in front of the blade to block the flow of snow over the side edges of the blade, runners on the forward ends of the side plates for supporting the blade above the surface from which snow is to be plowed, and a strut having one end fixed to the blade and the other end fixed to the handle.

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**4,166,331**
**STEAM FINISHING PLATEN**
**Marshall E. Wallace, Louisville, Ky., assignor to W. M. Cissell Manufacturing Company, Louisville, Ky.**
**Filed Jun. 21, 1978, Ser. No. 917,420**
**Int. Cl.[2] D06F *71/34***
**U.S. Cl. 38—15** **7 Claims**

1. A steam finishing platen for use in smoothing a textile workpiece comprising

a housing defining an interior chamber, said housing including a perforated head plate through which steam and air may be passed,

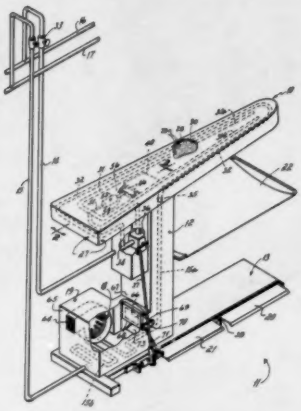
an air port in said housing,

a steam damper adapted to open and close said air port,

up-steam piping disposed within said interior chamber, said up-steam piping being connectable with a steam supply source,

a steam piston connected with said steam damper, and connected with said up-stream piping, and

a control valve in a steam supply line connected with said up-stream piping and said steam piston, said steam piston being automatically operable to close said steam damper



in response to steam being provided in said up-steam piping through use of said control valve.

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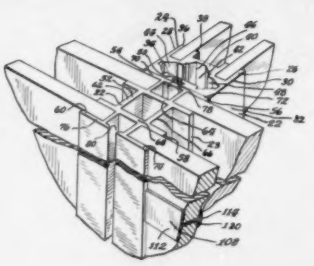
**4,166,332**
**PORTABLE DISPLAY APPARATUS**
**John E. Donovan, Skokie, Ill., assignor to Package Exhibit Programs, Inc., Niles, Ill.**
**Continuation-in-part of Ser. No. 688,821, Jun. 1, 1976, Pat. No. 4,030,219. This application Jun. 20, 1977, Ser. No. 807,979**
**Int. Cl.[2] G09F *13/00***
**U.S. Cl. 40—605** **6 Claims**



1. In a portable display apparatus for use in exhibitions, shows and the like, said display apparatus having a plurality of pairs of parallel elongated uprights connected to each other, and a pair of parallel display panels slidably mounted between each of said pair of parallel uprights, the improvement being wherein: each upright of a selected pair of parallel uprights is an extruded section having an elongated central support portion, each central support portion having four sides, a pair of parallel tracks formed integral with one side of each of the central support portions and being coextensive therewith, each track in each pair of parallel tracks being open in the same direction as the other track of that pair, each of said parallel tracks extending toward the opposite parallel track of the other upright of the pair of uprights, each of said pairs of opposed tracks removably and slidably receiving one of the pair of parallel display panels, a second pair of parallel tracks formed integral with the side of each central support portion opposite the one side, each track in each second pair of parallel tracks being open in the same direction as the other track of that pair, each of said tracks of each second pair of tracks being open in the direction opposite to the direction in which the first mentioned pair of parallel tracks on the respective central support

portion is open, each of said tracks of each of said second pair of parallel tracks slidably and removably receiving a display panel of another pair of parallel display panels, and a third side of each of the central support portions having a face parallel to the first mentioned parallel display panels, each said third side having a slot between a pair of oppositely facing tracks, including, a dual track elongated upright being an extruded section, said dual track upright including, an elongated support portion, a pair of parallel tracks formed integral with one side of the support portion, each track of said pair of parallel tracks formed integral with the support portion being open in the same direction as the other track of that pair, each of said tracks formed integral with the support portion slidably and removably receiving one of a pair of parallel dual track display panels, a connector portion formed integral with the support portion on the side opposite the side having the pair of parallel tracks, said connector portion having a slot; and a connector mounted in the slot of the connector portion and in the slot of the central support portion of an upright to link that upright to the dual track upright.

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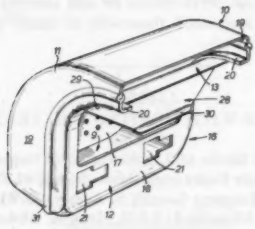
**4,166,333**
**SPENT SHELL CONTAINER**

**Erich E. F. Kratzer, 26 Bight Ct., Mermaid Beach, Queensland, 4218, Australia**

**Filed Nov. 28, 1977, Ser. No. 855,255**
**Claims priority, application Australia, Dec. 3, 1976, PC8360**
**Int. Cl.[2] F41C *27/00***
**U.S. Cl. 42—1 T** **6 Claims**



1. An assembly for gathering shells ejected from the action of a firearm comprising an open top container having at least front and rear walls for receiving said shells, and attachment means for removably securing said container to said firearm adjacent the action thereof, the rear wall of said container extending upwardly and across the action in spaced relation thereto for attachment of a telescopic sight to said firearm, said rear wall forming when inverted a discharge chute from said container for the shells collected therein, and deflection means secured to said container below said discharge chute to direct shells from said container, said deflection means and said discharge chute being so arranged that the assembly may be selectively used with said deflection means to collect shells from a firearm with an open sight and with or without said deflection means to collect shells from a firearm with a telescopic sight.

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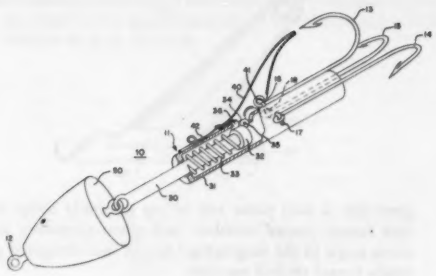
**4,166,334**
**SELF-SETTING WEEDLESS LURE**

**Richard Talalaj, 5138 Jerome, Skokie, Ill. 60076**

**Filed May 18, 1978, Ser. No. 907,181**
**Int. Cl.[2] A01K *85/02***
**U.S. Cl. 43—35** **6 Claims**

1. A fish lure comprising, in combination, a body, a longitudinally extending plunger reciprocably mounted in the body and having provision for connection to a fishing line at its forward end, a hook on the body having a point in hooking position, a spring interposed between the rear end of the plunger and one end of the body for biasing the body into a forwardly-telescoped position on the plunger, a latch mechanism between the plunger and the body for latching the body in a rearwardly extended position with respect to the plunger accompanied by stressing of the spring, and a latch triggering member movably mounted on the body and so arranged that



when a fish bites down on the lure the triggering member is actuated and the latch releases the body, thus freeing the spring to snap the body and hook forwardly on the plunger for setting of the hook in the mouth of the fish.

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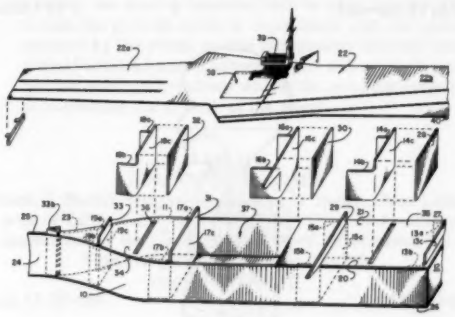
**4,166,335**
**LARGE MODEL BOAT ASSEMBLY**

**Bennett P. LaBorde, Jr., P.O. Box 552, Scott, La. 70583**

**Filed Dec. 13, 1977, Ser. No. 855,061**
**Int. Cl.[2] A63H *23/02***
**U.S. Cl. 46—1 R** **1 Claim**



1. A boat model assembly capable of floating in water comprising a braced cardboard hull assembly and a cardboard deck, said assembly comprising flat cardboard side walls attachable at their bow ends to each other and connected at their opposite ends by a flat cardboard stern wall, flat rectangular braces having flexible cardboard end flaps at each end of each brace, the braces extending between the side walls and attached thereto by glueing said flaps to the side walls, and a flat cardboard bottom attached to the side walls at their bottom ends.

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**4,166,336**
**BUBBLE FORMING DEVICE**

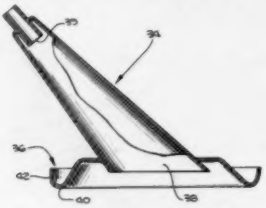
**Forrest D. Smith, P.O. Box 222, Orleans, Calif. 95556**

**Filed Apr. 15, 1977, Ser. No. 787,769**
**Int. Cl.[2] A63H *33/28***
**U.S. Cl. 46—6** **6 Claims**

1. A bubble forming device for blowing bubbles upwardly, downwardly or to the side comprising:

an elongated generally funnel shaped member open at both ends and having a mouthpiece end at the small end of said funnel shaped member and a bubble forming end at the

large end of said funnel shaped member, said bubble forming end terminating in a lip, said lip defining generally a plane, said lip including a film supply surface positioned



generally in said plane and facing generally away from said funnel shaped member, said plane extending at an acute angle to the longitudinal axis of said elongated generally funnel shaped member.

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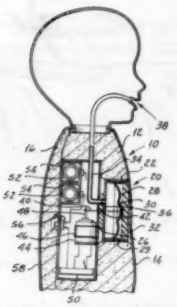
**4,166,337**

## DOLL WITH HEARTBEAT SIMULATOR

**Witold W. Kosicki, Columbia; Charles J. Corris, Irmo, and Robert T. Potter, Columbia, all of S.C., assignors to Horsman Dolls Inc., Columbia, S.C.**

**Filed Jul. 7, 1977, Ser. No. 813,501**
**Int. Cl.[2] A63H *33/26***
**U.S. Cl. 46—232** **15 Claims**



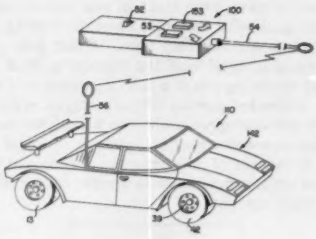
1. In a doll, a heartbeat simulator comprising a diaphragm of resilient material, means mounting said diaphragm in said doll for movement between an equilibrium position and a displaced position, the construction and arrangement of said diaphragm being such as to provide a popping sound in the course of its movement both from said equilibrium position to said displaced position and from said displaced position back to said equilibrium position, and means for applying a force to said diaphragm in such a direction and for a sufficient period of time to move said diaphragm to said displaced position and then removing said force to permit the diaphragm to return to its equilibrium position under the action of the resilience of said resilient material, the relationship between said force applying means and the resilience of said material being such that said diaphragm moves more rapidly from one of said positions to the other than from said other position to the one whereby the sound produced in the course of one cycle of movement of said diaphragm closely resembles a human heartbeat sound, said force applying means applying said force at periodic intervals approximating those of a human heartbeat.

**4,166,338**

## STEERING SYSTEM FOR RADIO OR WIRE CONTROLLED TRAVELING TOYS

**Kiyoji Asano, Tokyo, Japan, assignor to Shinsei Kogyo Co., Ltd., Japan**

**Filed Feb. 3, 1978, Ser. No. 874,783**
**Int. Cl.[2] A63H *30/02***
**U.S. Cl. 46—253** **12 Claims**



1. A steering mechanism for remote controlled traveling toys such as model cars and the like comprising: a main support chassis, drive means mounted on one end of said support chassis for effecting propulsion movement thereof, steering means mounted at the other end of said support chassis for effecting steering thereof, a pair of planetary gear clutch mechanisms mounted on said support chassis and arranged to effect a steering force from said drive means to said steering means, and solenoid means associated therewith to cause said steering force to occur.

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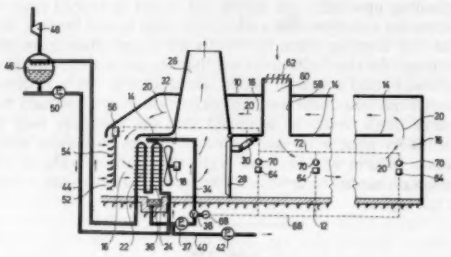
**4,166,339**

## GREENHOUSE WITH HEATING AND VENTILATING MEANS

**László Heller, 45 Bimbo ut; László Forgó, 14 Nephadsereg utca; István Papp, Ady Endre utca; János Bódás, 41 Filler utca, all of Budapest, Hungary; Georgij S. Agejev, 38/81 Micsurinszkij proszpekt, Moscow, U.S.S.R.; Ivan A. Alekszejev, 45/10 Krasznoszelszkja, Moscow, U.S.S.R., and Ruben G. Minaszjan, 20/11 Szemasko u., Moscow, U.S.S.R.**

**Continuation of Ser. No. 639,972, Dec. 11, 1975, abandoned.**
**This application Jul. 21, 1977, Ser. No. 817,920**
**Int. Cl.[2] A01G *9/00***
**U.S. Cl. 47—17** **1 Claim**



1. A greenhouse in combination with a steam turbine plant comprising, in combination, a casing, an air passage in said casing, a surface heat exchanger in said air passage, means for spraying water over said heat exchanger, a basin beneath said heat exchanger for collecting water falling from said heat exchanger, means for returning water from said basin to said spray means, a waste heat source consisting of a mixing condenser of said steam turbine plant which supplies hot liquid condensate to said heat exchanger to heat said heat exchanger, means for returning to said mixing condenser said condensate cooled in said heat exchanger and for using said cooled con-

densate to condense steam from said steam turbine plant in said mixing condenser, means for circulating air in said passage through said surface heat exchanger, a partition dividing said air passage in said casing into upper and lower air passage portions in which air passes through said casing in opposite directions, a first air inlet upstream of said heat exchanger for admitting air into said lower air passage portion, a chimney downstream of said heat exchanger for discharging air from said air passage and thereby from said greenhouse, a second air inlet farther downstream of said heat exchanger than said chimney for admitting air into said lower air passage portion, a sluice mounted for swinging movement in said lower air passage between one position in which said sluice blocks said lower air passage portion between said chimney and said second air inlet and establishes communication between said chimney and said heat exchanger, and another position in which said sluice establishes communication between said heat exchanger and said second air inlet along said lower air passage portion and interrupts communication between said heat exchanger and said chimney, and means responsive to the temperature in said lower air passage portion to swing said sluice between said positions.

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**4,166,340**

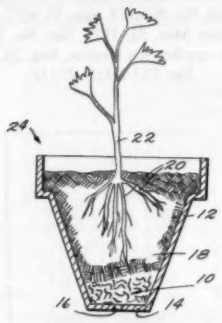
## POT LINING METHOD WITH RECLAIMED TIRE FIBERS

**Ricks H. Pluenneke, Rte. 7, Box 441E, Fort Worth, Tex. 76119**

**Continuation of Ser. No. 658,920, Feb. 18, 1976, abandoned. This application Oct. 27, 1977, Ser. No. 846,022**

**Int. Cl.² A01G** *9/00*

**U.S. Cl. 47—58** **4 Claims**




1. A method for potting a live plant comprising the steps of disposing a plurality of loose fibers comprising the fiber fraction from used tire break up in the interior of a pot adjacent to, and at least in partial contact with, the bottom thereof, and

placing soil and the roots of a plant to be potted on top of the loose fibers of the used tire fiber fraction.

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**4,166,341**

## METHOD AND APPARATUS FOR CULTIVATION OF PLANTS GROWN SINGLY IN SEPARATE BEDS

**Bent Vestergaard, 5 Hoeholmvej, 26 Taastrup, Denmark**

**Continuation-in-part of Ser. No. 604,155, Aug. 13, 1975, abandoned. This application Sep. 20, 1977, Ser. No. 834,974**

**Claims priority, application Denmark, Aug. 13, 1974, 4300/74; May 28, 1975, 3095/75**

**Int. Cl.² A01G** *31/02*

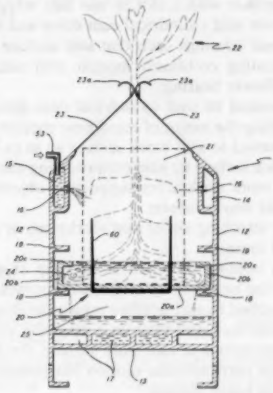
**U.S. Cl. 47—59** **21 Claims**

1. A method for cultivating in a minimum area plants growing singly in individual porous root support beds that comprises:

arranging linearly spaced individual beds of single plants on support surfaces in at least two adjacent horizontal channels, the support surfaces being spaced above the bottoms of the respective channels;

continuously flowing fluid cultivation regulation media into each channel to supply said media to the individual beds in the channel;

continuously draining off residuary noxious substances from the plants in the space between the support surface and the bottom of each channel;



increasing the spacing between adjacent beds in each channel during the growth cycle in accordance with the space required by the growing plants and

increasing the spacing between beds in adjacent channels during the growth cycle, in accordance with the space required by the plants, so that the spacings between individual beds in adjacent channels as well as in each channel are increased progressively during the growing cycle to accommodate the growth of the plants.

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**4,166,342**

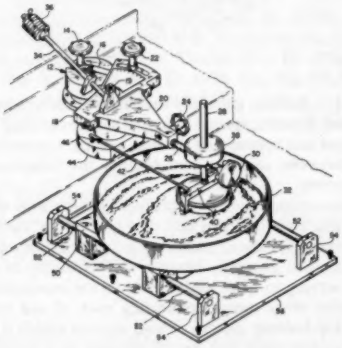
## TOROIDAL POLISHER

**Joseph J. Shaffer, Ridgecrest, and John D. Butler, China Lake, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Nov. 21, 1977, Ser. No. 853,777**

**Int. Cl.² B24B** *7/02*

**U.S. Cl. 51—58** **18 Claims**



1. A toroidal polisher using a workpiece and a lap comprising:

a motor;

a spindle attached to and rotated by said motor;

a cylindrical cam drive mounted on said spindle for convert-

ing said spindles rotary motion into reciprocating rectilinear motion;

a base plate lacking a central area so that said base plate can be placed such that said cylindrical cam drive protrudes through said central area;

a plurality of rods attached to said base plate for guiding said reciprocating rectilinear motion;

a plurality of linear bearings mounted on said rods for providing low friction motion over said rods;

a work surface with a slot in one side which has said slot fitted over said cylindrical cam drive and is connected to said linear bearings such that said surface is driven with reciprocating rectilinear motion over said rods by said cam follower bearing;

means fastened to said cylindrical cam drive for variably controlling the range of rectilinear motion produced;

means fastened to said work surface so as to be driven with said work surface by said reciprocating rectilinear motion of said work surface for supporting objects which move with said work surface;

means for attaching either said workpiece or said lap to said support means;

means for holding the other of said lap or said workpiece against the one held by said attaching means; and

means attached to said holding means for driving said holding means back and forth in a direction perpendicular to the linear motion of said work surface, the amount of back and forth perpendicular motion independent of said back and forth linear motion.

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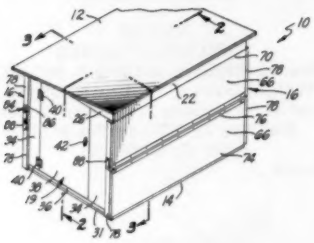
**4,166,343**

## COLLAPSIBLE STRUCTURES

**Edward D. O'Brian, 910 Iroquois St., Anaheim, Calif. 92801, and William M. Plachy, 3533 Encinitas Rd., San Marcos, Calif. 92069**

**Filed Jan. 26, 1977, Ser. No. 755,997**
**Int. Cl.[2] E04B *1/344***
**U.S. Cl. 52—66** **7 Claims**



1. In a hollow, generally rectilinear structure having a top, a bottom, parallel, spaced, opposed sides extending between said top and said bottom and parallel, spaced, opposed ends extending between said top and bottom the improvement which comprises:

frame means for use in providing space into which both of said ends fit when said structure is in a folded configuration, said frame means forming a part of said top, being located generally beneath the remainder of said top and serving to space said sides from the remainder of said top,

a first hinge means connecting each of said ends with said top holding the one of said ends to which it is connected so that such end can be pivoted to a position generally parallel to said top and within said frame means,

each of said sides consisting of an even number of panels having parallel top and bottom edges,

said panels in each of said sides being located in edge to edge relationship with the lowermost of said panels being located with a bottom edge against said bottom and with the uppermost of said panels being located with a top edge against said frame means,

another hinge means connecting the top of the uppermost of said panels of each of said sides with said frame means,

a further hinge means connecting the bottom of each of said panels of each of said sides with said bottom,

intermediate hinge means on each of said sides connecting the adjacent side edges of said panels together,

said other, said further and said intermediate hinge means being oriented so as to permit both of said sides to be folded generally between said bottom and said frame means when said ends are positioned generally within said frame means,

said ends fitting closely with respect to the interiors of said sides so as to abut against said sides to prevent folding of said panels of said sides and serving to reinforce said sides against movement relative to said top and said bottom,

each of said sides consists of two of said panels,

a lip means at the end of each of said panels, said lip means extending from said panels so as to cover the edges of said ends adjacent to said sides,

said lip means on the uppermost of said panels of said sides overlap the extremities of said ends which are attached to said first hinge means when both said ends and said sides are in said folded position,

said lip means on the lowermost of said panels of said sides overlap the extremities of said bottom when both said sides and said bottom are in said folded configuration.

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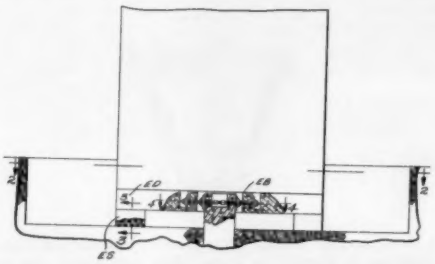
**4,166,344**

## EARTHQUAKE GUARDING SYSTEM

**Aristarchos S. Ikonomou, Evrovstr. 90, Athens 609, Greece**

**Continuation of Ser. No. 399,175, Sep. 20, 1973, abandoned. This application Mar. 31, 1977, Ser. No. 783,310**
**Claims priority, application Greece, Sep. 21, 1972, 45907**
**Int. Cl.[2] E02D *27/34***
**U.S. Cl. 52—167** **20 Claims**



1. A structure having a superstructure and at least one load distributing base supporting said superstructure, the connections between said structure and the earth being essentially a support means and a connecting means said support means transferring to the ground the load of the structure in a first direction from said load distributing base, said support means comprising elastic means joined to said structure and joined to the ground which provides elastic resistance to movement of the structure in all directions perpendicular to said first direction so that said support means is able to follow dynamic movements of the ground in said perpendicular directions without transferring great forces from the ground to said base in said perpendicular directions, said structure being provided with peripheral clearance from the ground in said perpendicular directions so that said base can move a predetermined distance through said clearance relative to the ground in said perpendicular directions,

said connecting means being connected respectively to said base and to the ground in a said perpendicular direction, said connecting means being sufficiently strong to substantially prevent movement of said structure under forces in

said perpendicular directions less than a predetermined magnitude but sufficiently weak to abruptly disconnect the connection between the ground and the base immediately upon being subject to a force of said predetermined magnitude when said base has moved a small proportion of said predetermined distance in said perpendicular direction, thereby removing the restraint against movement of the structure in said perpendicular direction by removing the transmission of forces in said perpendicular direction through said connecting means so that the load of said structure remains supported on said support means which thereafter provides the only essential connection to the ground, said support means having sufficient elastic stiffness in said perpendicular direction to apply restoring forces to said structure and to safely transfer loads in said perpendicular direction from the structure to the ground, after said connecting means has disconnected, thereby permitting the structure to move relative to the ground in said perpendicular direction through said peripheral clearance against the elastic resistance of said support means and in accordance with abruptly changed dynamic characteristics and to withstand said dynamic movements of the ground.

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**4,166,345**

## LIGHT-TRANSMISSIVE, SOUND AND HEAT INSULATING BUILDING ELEMENT

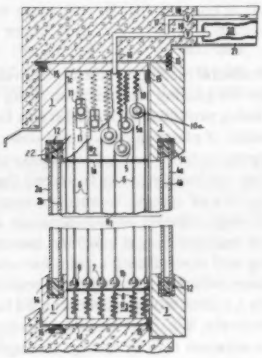
**Otto A. Becker, Robert Koch-Str. 59, Saarbruecken, Fed. Rep. of Germany**

**Filed Dec. 28, 1976, Ser. No. 754,948**

**Claims priority, application Fed. Rep. of Germany, Dec. 31, 1975, 2559342; Sep. 3, 1976, 2639656**

**Int. Cl.[2] E04C *2/36*; E04B *1/74***

**U.S. Cl. 52—172** **11 Claims**



1. A light-transmissive building element comprising

(a) frame means,

(b) window panes mounted in transversely spaced relation on said frame means, said panes defining a hollow space therebetween,

(c) means for sealing said panes in said mounting in said frame,

(d) a plurality of light-transmissive sheets mounted in spaced relation from each other and between said panes in said hollow space, and

(e) means for independently and variably elastically tensioning each of said sheets, whereby each of said sheets will vibrate and thus oscillate at a predetermined range of resonant frequencies in response to acoustic energy at said resonant frequency, said resonant frequencies for each of said sheets thus being variable and dependent on the tension applied independently to said sheets, wherein each of said independent elastic tensioning means comprises spring tensioned roller means around which at least one end of each sheet is wound, and resilient tensioning means operatively connecting said roller means and said sheet, with predetermined tension, to said frame means.

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**4,166,346**

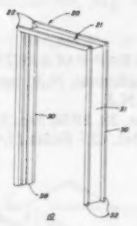
## PREFABRICATED DOOR ASSEMBLY

**Gerald L. Barr, 11041 Lake Hazil Rd., Boise, Id. 83705**

**Filed May 15, 1978, Ser. No. 905,729**

**Int. Cl.[2] E06B *1/04***

**U.S. Cl. 52—211** **4 Claims**



1. A prefabricated door assembly for installation in a roughed-in door frame comprising:

a pair of jamb units adapted for vertical positioning parallel to the sides of the door frame, each of said jamb units including a side panel having longitudinal grooves in opposing longitudinal edges thereof and a pair of vertically oriented casings, each having transverse tongues for engaging an opposing longitudinal groove of said side panel; and

a header unit spanning the upper ends of said jamb units, said header unit including a header member having a pair of recesses on its under side adjacent opposing terminal ends thereof, the recesses adapted to receive the upper terminal ends of said side panels, said recesses inclined slightly outward from vertical to impress an outward pressure on said side panels so received, a pair of longitudinal grooves in opposing longitudinal edges of said header member and a pair of horizontally oriented casings, each casing having a transverse tongue for engaging an opposing longitudinal groove of said header member.

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**4,166,347**

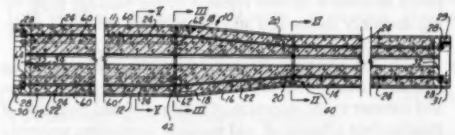
## COMPOSITE STRUCTURAL MEMBER AND METHOD OF CONSTRUCTING SAME

**Joe C. Pohlman, P.O. Box 15098, Pittsburgh, Pa. 15237, and James P. Romualdi, 5737 Wilkins Ave., Pittsburgh, Pa. 15213**

**Continuation-in-part of Ser. No. 733,094, Oct. 18, 1976, abandoned. This application Apr. 24, 1978, Ser. No. 898,702**

**Int. Cl.[2] E04C *3/10, 3/34***

**U.S. Cl. 52—223 R** **11 Claims**



1. A composite structural member comprising:

an elongated outer metal casing;

a body of non-metallic settable rigid material encased by and extending between the ends of said casing;

a plurality of elongated reinforcing members embedded within the said body and extending between the ends of said casing and communicating with said casing, each reinforcing member being under a predetermined magni-

tude of applied pre-stress and being arranged to transmit the applied pre-stress only to said casing; and

securing means supported by said casing for securing said reinforcing members to said casing such that the applied pre-stress remains permanently on said casing only.

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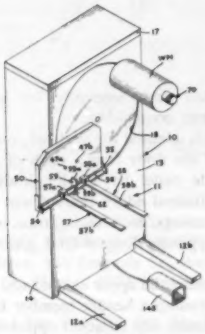
**4,166,348**

## TENSION WRAP PACKAGING MACHINE

**Robert F. Carlson, Lafayette, N.J., assignor to Stretch Wrap, Inc., Cedar Grove, N.J.**

**Filed Apr. 28, 1978, Ser. No. 900,872**
**Int. Cl.[2] B65B *13/04***
**U.S. Cl. 53—556** **14 Claims**



1. In a machine for wrapping a package utilizing a wrapping material to be applied with a predetermined tension to the package,

a. frame means,

b. a main drive shaft assembly mounted in said frame means,

c. driving means connected in said frame means and connected to the main drive shaft assembly for rotating the same at a predetermined rate of rotation,

d. supporting means fixedly connected to and rotatable with the main drive shaft,

e. package supporting assembly means connected to and rotatable with the supporting means for holding the package to be wrapped,

f. means connected to said package supporting assembly means for rotating the same independently of said supporting means,

g. wrapping material supporting assembly means also connected to and rotatable with the supporting means, disposed thereon in spaced relation to the package supporting assembly means and adopted to hold wrapping material therein,

h. means for rotating the wrapping material supporting assembly means independently of the supporting means and counter to the direction of rotation of said direction of independent rotation of said package supporting assembly means whereby said wrapping material is dispensed and applied about the package to be wrapped, and

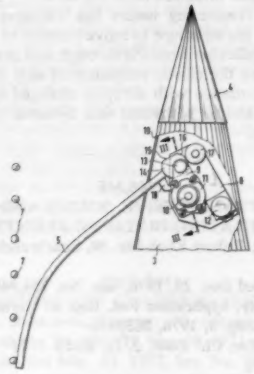
i. means operatively associated with said means for rotating the wrapping material supporting assembly means for applying an adjustable force on the wrapping material as the same is dispensed from the wrapping material supporting assembly means to adjust the tension thereof as the wrapping material is applied about the package being wrapped on said package supporting assembly means.

**4,166,349**

## SENSING DEVICE FOR GUIDING A HARVEST MACHINE

**Hans-Helmut Coenenberg, Bielefeld; Helmut Homburg, and Horst Ziems, both of Harsewinkel, all of Fed. Rep. of Germany, assignors to Firma Gebr. Claas Maschinenfabrik GmbH, Harsewinkel, Fed. Rep. of Germany**

**Filed Dec. 5, 1977, Ser. No. 857,840**
**Claims priority, application Fed. Rep. of Germany, Feb. 10, 1977, 2705491**
**Int. Cl.[2] A01D *75/14***
**U.S. Cl. 56—10.2** **15 Claims**



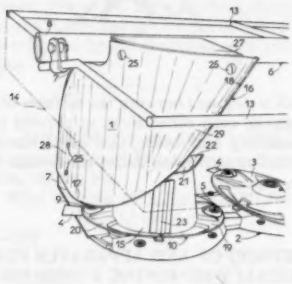
1. In an agricultural machine of the type having an automatic steering system for guiding said machine along rows of plants, said machine being provided with at least one feeler adapted to sense the location of plants in one of said rows to control said automatic steering system, and said machine also including a plant harvesting mechanism at the front end thereof cooperating with a plurality of spaced forwardly extending elongated casings comprising dividers which separate adjacent plant rows from one another as said machine moves in a forward direction along said rows during a plant harvesting operation, the improvement wherein two adjacent ones of said divider casings include a pair of elongated slots in the facing side walls thereof, respectively, a pair of feelers extending respectively from said two adjacent divider casings through the elongated slots in said casings in opposed relation to one another on opposite sides of the plants in said one of said rows, each of said feelers comprising a rod having one end thereof mounted for pivotal motion within its said casing, a transducer for each of said feelers located within the casing associated with said feeler adjacent said pivotally mounted one end of said rod and responsive to pivotal movement of said one end of said rod within its said casing for generating a control signal for said automatic steering system, said rod for each of said feelers extending from the interior to the exterior of its said casing through the elongated slot in said casing in a direction transverse to the direction of elongation of its said casing, the exterior portion of each of said rods extending from its said elongated slot in a rearward direction relative to said machine to a position rearward of the rear end of said slot and being curved into a comparatively shallow, convex arcuate configuration which bows outwardly from said side wall of the divider casing in which said rod is pivotally mounted to cause said rod to contact simultaneously at least two of the stalks in said one of said plant rows when said control signal is to be generated.

4,166,350

## FRONT DEFLECTOR FOR A MOWER HAVING CUTTER-CARRYING DISCS DRIVEN FROM BENEATH

Anton Werner, Saverne, France, assignor to Kuhn, S.A., Saverne, France

Filed Jul. 7, 1977, Ser. No. 813,699
Claims priority, application France, Jul. 20, 1976, 76 23086
Int. Cl.[2] H01D *55/18*
U.S. Cl. 56—320.1 6 Claims



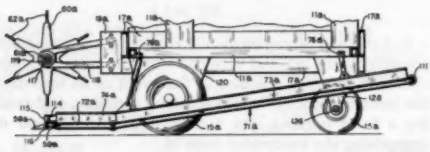
1. A front deflector for a mower having discs driven from beneath by transmission elements located in an elongated housing, said housing being connected to a beam located above said discs by means of an arm extending between said beam and said housing, in the vicinity of at least one of said discs located at one end of said housing, this disc being surmounted by a truncated cone, said deflector comprising an edge which cooperates with the truncated cone which it partially surrounds, this edge extending from a lower end located above the sector swept by the rear outer part of said disc and in the vicinity of the latter to an upper end located approximately above the sector swept by the forward part of said disc, the distance between the upper part of said disc and said edge of the deflector increasing from said lower end to said upper end.

4,166,351

## AGRICULTURAL DO-ALL MACHINE

Raymond F. Nienberg, Box 44, Glandorf, Ohio 45848

Continuation-in-part of Ser. No. 486,060, Jul. 5, 1974, Pat. No. 3,971,446, which is a continuation-in-part of Ser. No. 309,156, Nov. 24, 1972, abandoned. This application Jun. 21, 1976, Ser. No. 697,860
The portion of the term of this patent subsequent to Jul. 27, 1993, has been disclaimed.
Int. Cl.[2] A01D *45/00*
U.S. Cl. 56—192 19 Claims



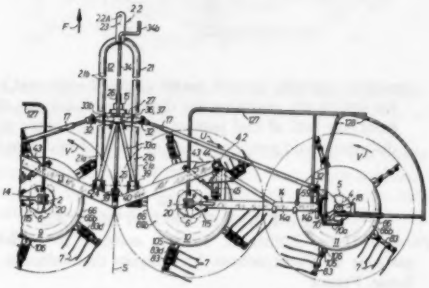
1. A farm vehicle comprising: a longitudinally extending vehicle frame, ground engaging drive mechanism supporting said frame with clearance from the ground, a pair of implement support booms projecting laterally from opposite sides of said frame, a longitudinally extending underbelly conveyor being supported by said frame in said clearance between said frame and the ground for moving material to the back of said vehicle, and conveyor means on said implement support booms for moving harvested material laterally onto said underbelly conveyor, said conveyor means being positioned forwardly of said ground engaging drive mechanism, and said underbelly conveyor being constructed and arranged to move harvested material from said conveyor means to the rear of said vehicle beneath said vehicle frames.

4,166,352

## HAY-MAKING MACHINE

Gregor Kniisting, Lengede, Fed. Rep. of Germany, assignor to Wilhelm Stoll Maschinenfabrik GmbH, Lengede, Fed. Rep. of Germany

Filed May 16, 1977, Ser. No. 797,240
Claims priority, application Fed. Rep. of Germany, May 20, 1976, 2622486
Int. Cl.[2] A01D *81/00*
U.S. Cl. 56—366 21 Claims



1. A hay-making machine having several rotary rakes which are driven rotatingly about approximately vertical axes of rotation and are supported on the ground by means of wheels, comprising:

a machine frame having a tongue, a main frame and auxiliary frames, said main frame being arranged hingedly on said tongue;

at least an inner and an outer rotary rake mounted on each auxiliary frame to form one group, each inner and outer rotary rake having an input shaft for effecting a drive thereof and adjusting means for fixing said auxiliary frames to said main frame in various adjusted positions;

a main gearing mounted on said tongue and having two lateral output shafts;

a telescopingly elongatable drive shaft connecting each of said lateral output shafts to said input shaft to said outer rotary rake in each group and a longitudinally variable drive shaft for connecting the drive to said outer rotary rake to said input shaft to said inner rotary rake; and

means for effecting an inclination adjustment of said main frame with respect to said tongue.

4,166,353

## TWO-WAY RAKE

Harold K. Garrison, Newton, and Martin E. Pruitt, Hesston, both of Kans., assignors to Hesston Corporation, Hesston, Kans.

Filed Jun. 20, 1977, Ser. No. 808,333
Int. Cl.[2] A01D *77/06*
U.S. Cl. 56—377 23 Claims

1. A pull-type farm implement comprising:

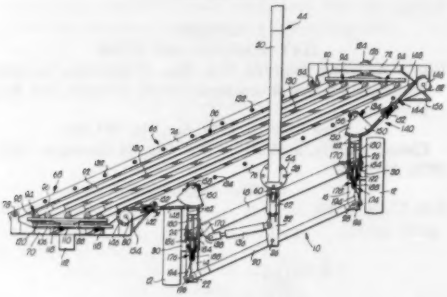
a chassis having a towing member extending forwardly therefrom in a predetermined angular attitude with respect to the normal path of travel of the implement;

ground-engaging means supporting said chassis for movement along said path of travel;

a header carried by said chassis and operable to deliver ground-engaging crop material from a position in line with said path of travel to a laterally displaced position on a selected one side of said path of travel,

said chassis being provided with means for permitting up-

and-down swinging movement of said header relative to said ground-engaging support means; and



remotely operable control means coupled with said header for selectively reversing the direction of delivery thereof from one side of said path of travel to the other without disturbing said predetermined attitude of said member.

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**4,166,354**

## FREED-FIBER SPINNING DEVICES

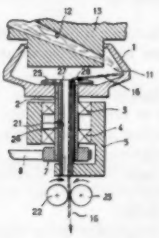
**Fernand Duba, Zillisheim, France, assignor to Societe Alsacienne de Constructions Mecaniques de Mulhouse, Mulhouse, France**

**Filed Oct. 5, 1977, Ser. No. 839,416**

**Claims priority, application France, Oct. 14, 1976, 76 30872**

**Int. Cl.[2] D01H *1/12***

**U.S. Cl. 57—58.89** **3 Claims**



1. An open-end spinning device for forming yarn, said device comprising:

a rotating vacuum chamber having an axis of rotation; and

a stationary central tubular yarn-exit component including a first convex annular surface of revolution constituting a bearing plate for said yarn, said component including a second surface of revolution means defining a yarn guide tube, said first surface comprising a convex surface of revolution, said first surface including means defining a plurality of cylindrical air-displacement cavities, each of said cavities having an axis parallel to said axis of rotation.

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**4,166,355**

## CABLE AND METHOD AND DEVICE FOR PRODUCING SAME

**Friedbert Gross, 8601 Weissenberg i. Sa., August-Bebel-Platz 7, German Democratic Rep.**

**Filed Jun. 9, 1978, Ser. No. 914,115**

**Claims priority, application German Democratic Rep., Jun. 17, 1977, 199563**

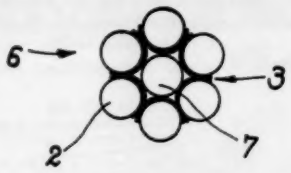
**Int. Cl.[2] D07B *1/16*; D02G *3/48***

**U.S. Cl. 57—212** **15 Claims**

1. A cable for the reinforcement of plastic and elastic articles, such as conveyor belts and the like, comprising:

a plurality of metal strands which are twisted to form a cable; and

a non-metallic insert which comprises at least two flexible flat, sheet-like strips which are thin relative to said strands,




and which is disposed between the surfaces of the strands which oppose each other so as to prevent said strands from contacting each other, said insert leaving the surfaces of said strand which define the outside diameter of the cable exposed.

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**4,166,356**

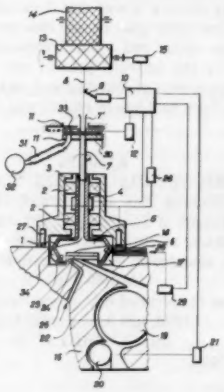
## METHOD OF AND APPARATUS FOR PNEUMATICALLY REMOVING A FIBROUS RIBBON OR A SEVERED YARN END FROM THE SPINNING ROTOR OF AN OPEN-END SPINNING MACHINE

**Milan Chrtek, Ceska Trebova; Frantisek Tuma; Josef Gabler, both of Usti n. Orlici; Karel Kasparek, Bohusova, and Jan Blasko, Usti n. Orlici, all of Czechoslovakia, assignors to Vyzkumny ustav bavlnarsky, Usti nad Orlici, Czechoslovakia**

**Filed Jan. 11, 1978, Ser. No. 868,497**

**Int. Cl.[2] D01H *11/00, 1/12***

**U.S. Cl. 57—302** **10 Claims**



1. A method of pneumatically removing a fibrous ribbon and possibly even a severed yarn end from the spinning rotor of an open-end spinning machine in the event of an interruption of the spinning process in said spinning machine, said rotor having a front opening and a collecting channel, said method comprising the successive steps of:

withdrawing the fibrous ribbon or the severed yarn end from the spinning rotor by directing a first pressure air stream along the plane of the front opening of a spinning rotor toward an air withdrawing duct; and

scavenging the spinning rotor by directing a second pressure air stream against the collecting channel of the spinning rotor in order to remove any fibers and impurities therefrom.

4. An apparatus for pneumatically removing a fibrous ribbon and possibly even a severed yarn end from the spinning rotor of an open-end spinning machine in the event of an interruption of the spinning process, comprising:

a rotor having a front opening and a yarn take-off tube;
a cover adapted to close said rotor and having a fiber supply duct and an air withdrawing duct formed therein;
said rotor and cover being pivotally connected to each other; and
means operatively connected to said rotor for pivoting it away from said cover before said fiber-removing nozzle is actuated;
said cover having a fibrous ribbon removing nozzle formed therein; and
said nozzle having a mouth which in the cleaning position substantially lies in the plane of the spinning rotor front opening and is directed toward the mouth of said duct for withdrawing air, fibers, impurities, and possibly severed yarn ends.

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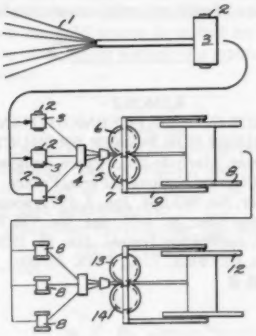
**4,166,357**

## METHOD OF MAKING ROPE

**William L. Carranza, Miami, Fla., assignor to Sunshine Cordage Corporation, Miami, Fla.**

**Filed May 16, 1977, Ser. No. 797,249**
**Int. Cl.[2] D02J *1/22***
**U.S. Cl. 57—310** **2 Claims**



1. The method of forming a stranded rope structure which comprises extruding a plurality of filaments of a member of the group consisting of polyethylene, polypropylene and copolymers of ethylene and proplyene, drawing said filaments while heating them, but without twisting, said filaments having 65 to 1,650 deniers thereafter twisting said untwisted filaments to form a strand of 22,500 to 1,080,000 deniers before said filaments have cooled to room temperature, and twisting a plurality of the resulting strands into a rope of 67,500 to 3,240,000 deniers and wherein the strands are twisted into a rope before the strands have cooled to room temperature.

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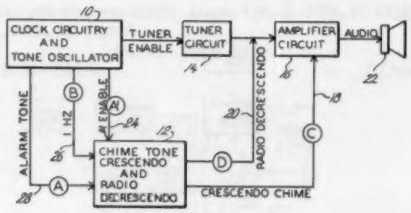
**4,166,358**

## SOLID STATE ALARM FOR CLOCK-RADIO

**Dennis D. Tremblay, LaSalle, and John Serafini, Peru, both of Ill., assignors to General Time Corporation, Thomaston, Conn.**

**Filed Mar. 25, 1977, Ser. No. 781,407**
**Int. Cl.[2] G04B *23/02*; H04B *1/06***
**U.S. Cl. 58—16 R** **6 Claims**

1. The combination with a clock radio of an alarm circuit comprising
(a) means for generating a ramp signal output,
(b) a pair of impedance means each having an input connected to said output and adapted to be controlled oppositely to a condition that one impedance increases in value and substantially simultaneously the other impedance decreases in value,
(c) a strike and chime generator having an intermittent output tone,
(d) means providing a radio output tone,
(e) means for amplifying said output tones,
(f) individual circuit means connecting said output tones to a respective one of said impedance means and said amplifier means,
(g) enabling means operable at a prescribed time to control said means generating said ramp signal output whereby the impedance means which increases in value dissipates




less of said strike and chime output tone and said impedance means which decreases in value dissipates more of said radio output tone, and
(h) means for discontinuing at least said strike and chime output tone so that said radio output tone, if not discontinued, will be dissipated to a lesser extent whereby said radio output tone will return in volume to its initial volume.

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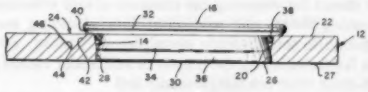
**4,166,359**

## WATCH BATTERY HATCH CONSTRUCTION

**Julius Domokos, Fountain Valley, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.**

**Filed Dec. 19, 1977, Ser. No. 861,596**
**Int. Cl.[2] G04B *37/00*; G04C *3/00***
**U.S. Cl. 58—23 BA** **7 Claims**



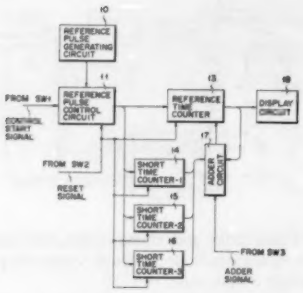
1. A watch back for a watch having a battery receiving recess therein, said watch back having a rear surface, having a circular hatch opening therein over said battery receiving recess and having a circular hatch cover for covering said hatch opening and said battery receiving recess;
walls defining a recess in said watch back adjacent said hatch opening;
said circular hatch opening in said watch back being larger in diameter adjacent said rear surface of said watch back than away from said rear surface of said watch back so that said hatch opening is tapered to ease insertion of said hatch cover;
said hatch cover being positionable in said hatch opening and being retained therein by a friction fit, said hatch cover having a flange thereon, said flange lying against said rear surface of said watch back and extending around said hatch opening, said recess being positioned closely adjacent said hatch opening so that said hatch cover flange partially overlies said recess so that a tool can be inserted into said recess and engaged under said flange to snap said hatch cover out of said hatch opening.

**4,166,360**

## CHRONOGRAPH

**Tetsuo Yamaguchi, Yokohama, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Japan**

**Filed Dec. 21, 1977, Ser. No. 862,902**
**Claims priority, application Japan, Dec. 24, 1976, 51/155780**
**Int. Cl.[2] G04F *8/00, 10/00, 7/04;* G06F *7/38***
**U.S. Cl. 58—39.5** **8 Claims**




1. A chronograph for measuring a plurality of time intervals comprising:

reference pulse generating means for generating time count reference pulses;

reference time counting means for counting said reference pulses to measure a reference time interval;

short time counting means for counting said reference pulses after said reference time counting means stops its counting operation to measure a short time interval succeeding said reference time interval;

first control means including a time count input start button for generating a sequence of first control signals in response to sequential actuation of said start button, said first control signals operating to apply said time count reference signals first to said reference time counting means and then to said short time counting means whereby said reference time interval is measured first followed by measurement of said short time interval;

second control means including an addition command start button operable to generate an addition signal;

adder means for summing the contents of said reference time counting means and said short time counting means in response to said addition signal;

means for transferring the output of said adder means to said reference time counting means; and

display means for displaying the contents of said reference time counting means, whereby upon actuation of said second control means the sum of said reference time interval and said short time interval is displayed.

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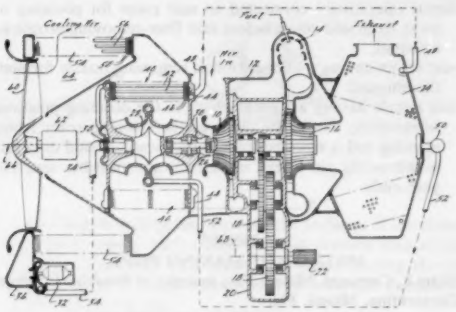
**4,166,361**

## COMPONENTS AND ARRANGEMENT THEREOF FOR BRAYTON-RANKINE TURBINE

**Ernest R. Earnest, Hobe Sound, and Bill Passinos, North Palm Beach, both of Fla., assignors to Hydragon Corporation, Lake Park, Fla.**

**Filed Sep. 12, 1977, Ser. No. 832,361**
**Int. Cl.[2] F02C *7/22***
**U.S. Cl. 60—39.18 R** **19 Claims**

1. An integrated combined Brayton cycle-Rankine cycle engine comprising a Rankine turbine and a rotary compressor driven thereby, a fuel system and combustor operating on air supplied by said compressor, a Brayton power turbine operating on products from said combustor, a Rankine fluid vaporizer heated by the exhaust products of said Brayton power turbine, a rotary feed pump driven by said Rankine turbine for circulating said Rankine fluid, a regenerator for recovering heat from said Rankine fluid leaving said Rankine turbine and for preheating said Rankine fluid supplied to said vaporizer, and a condenser for cooling and liquifying the fluid in the Rankine cycle system after the fluid passes through the regenerator, said Rankine turbine, compressor, Brayton power turbine, and feed pump all mounted on a common axis, and said vaporizer, condenser, and regenerator each having an annular core configuration and each mounted concentrically about said common axis.



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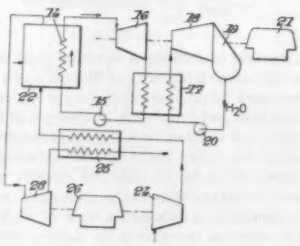
**4,166,362**

## METHODS OF AND THERMODYNAMIC APPARATUSES FOR POWER PRODUCTION

**Robert E. L. Laurent, Marly-le-Roi, France, assignor to Electricite de France (Service National), Paris, France**

**Continuation of Ser. No. 582,885, Jun. 2, 1975, abandoned. This application Mar. 21, 1977, Ser. No. 779,796**
**Claims priority, application France, Jun. 18, 1974, 74 21178**
**Int. Cl.[2] F02C *7/02;* F01K *25/00***
**U.S. Cl. 60—39.18 R** **8 Claims**



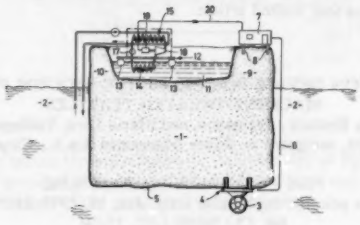
1. A binary cycle thermodynamic power plant comprising: a heat source; a closed first loop for circulation of sulphur, having a primary heat exchange means for effecting heat exchange between the source and the sulphur to receive the sulphur in substantially liquid condition and to convert the sulphur to saturated vapour, said primary heat exchange means having sulphur containing tubes of ferritic steel which are unreactive with sulphur and have a relatively low resistance to creep; at least one sulphur expansion turbine; and a first heat exchange means to condense the sulphur discharged by said at least one sulphur turbine; a second loop for circulation of water and steam including said first heat exchange means in which the water is evaporated and superheated; heat engine means for expanding and condensing the steam and means for returning the condensed water to said first heat exchange means, wherein said source includes a primary heat transfer fluid, and circulation means for circulating said sulphur and primary fluid at approximately equal pressures in said primary exchange means.

4,166,363

## METHOD OF ENERGY CONVERSION UTILIZING A TUBULAR ICEBERG

Georges L. Mougin, Paris, France, assignor to Societe ITI Ltd., Paris, France

Filed Mar. 8, 1978, Ser. No. 884,408
Claims priority, application France, Mar. 8, 1977, 77 06703
Int. Cl.[2] F03G *7/04*
U.S. Cl. 60—641 8 Claims



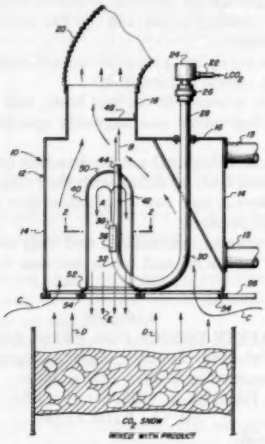
1. A method of energy conversion utilising a heat engine operating with hot and cold sources, wherein the hot source is seawater and the cold source is melted ice stored in a pool hollowed out of the upper surface of a tabular iceberg floating on the seawater.

4,166,364

## CARBON DIOXIDE SNOW HOOD

David R. Ruprecht, Laurys Station, and Norris G. Lovette, Breinigsville, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed May 15, 1978, Ser. No. 905,913
Int. Cl.[2] F25D *3/12*
U.S. Cl. 62—384 5 Claims



1. A snow hood for depositing carbon dioxide snow on a product comprising:

(a) an exhaust housing having an open bottom,

(b) a reversing diffuser chamber within said exhaust housing having side walls, a closed upper end, and an open bottom,

(c) means for separating a two-phase flow of gaseous and solid carbon dioxide into separate high velocity streams of gaseous and solid carbon dioxide, and

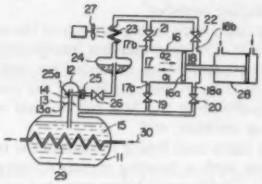
(d) means for directing said high velocity stream of solid carbon dioxide upwardly into said reversing diffuser chamber whereby said stream is reversed, diffused and reduced in velocity to form a dispersed, downwardly flowing, low velocity stream of carbon dioxide snow.

4,166,365

## APPARATUS FOR LIQUEFYING REFRIGERANT AND GENERATING LOW TEMPERATURE

Sanji Taneichi, 24-16 8-chome, Higashisuna, Koto-ku, Japan

Filed Oct. 5, 1977, Ser. No. 839,641
Claims priority, application Japan, Oct. 9, 1976, 51-121468; Oct. 9, 1976, 51-121469
Int. Cl.[2] F25B *19/00*
U.S. Cl. 62—514 R 5 Claims



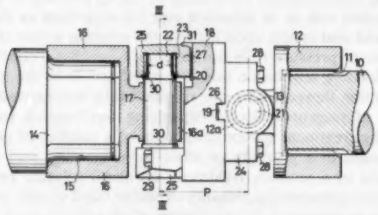
1. An apparatus for liquefying refrigerant and generating a low temperature, which comprises; a refrigerant tank for storing refrigerant; and an expansion chamber communicated with said refrigerant tank, said refrigerant being jetted into said expansion chamber through valve means which is intermittently opened and closed at predetermined time intervals to liquefy refrigerant gas and to cool the refrigerant liquid in said refrigerant tank, said expansion chamber is cylindrical, one end portion of said pipe communicating said refrigerant tank with said expansion chamber is protruded to the central portion of said expansion chamber, said pipe thus protruded having relatively small holes in the wall of the protruded portion thereof, and the jet nozzle of said control valve is arranged along the inner wall of said expansion chamber so as to form an eddy current when refrigerant gas is jetted therethrough.

4,166,366

## UNIVERSAL JOINT

Hiroji Okuda, and Akira Imada, both of Kitakatsuragigun, Japan, assignors to Koyo Seiko Company Limited, Osaka, Japan

Filed Jul. 25, 1977, Ser. No. 818,956
Claims priority, application Japan, May 13, 1977, 52-61946[U]
Int. Cl.[2] F16D *3/26*
U.S. Cl. 64—17 SP 3 Claims



1. A universal joint comprising:

a first yoke fittable to a drive shaft, the first yoke being fitted through splined engagement to an end of the drive shaft for integral rotation,

a first pin provided for the first yoke with its axis intersecting the axis of the first yoke at right angles thereto, the first pin being supported integrally by the first yoke and having a trunnion of a large diameter at each of its opposite ends,

a second yoke fittable to a driven shaft, the second yoke being fitted through engagement between an oval-shaped bore and a corresponding part of an end of the driven shaft for integral rotation,

a second pin provided for the second yoke with its axis intersecting the axis of the second yoke at right angles thereto, the second pin being supported integrally by the second yoke and having a trunnion of a large diameter at each of its opposite ends,

a connecting member disposed between the first and second pins, the connecting member positioning the first and second pins with their axes intersecting the axis of the connecting member as spaced apart from each other by a desired amount of offset and at right angles on the axis of the connecting member,

two bearing cases each fitting to each of the trunnions of the first pin with a bearing member interposed therebetween, the bearing cases being mounted on and secured by a plurality of bolts to one end face of the connecting member and positioning the first pin on that one side of the connecting member, and

two bearing cases each fitting to each of the trunnions of the second pin with a bearing member interposed therebetween, the bearing cases being mounted on and secured by a plurality of bolts to the other end face of the connecting member and positioning the second pin on that other side of the connecting member.

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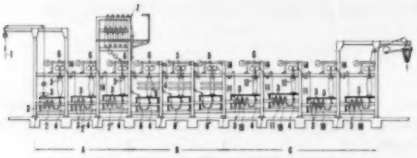
**4,166,367**

## CONTINUOUS MERCERIZING APPARATUS FOR CIRCULAR KNITTED ARTICLES

**Yoshikazu Sando, and Hiroshi Ishidoshiro, both of Wakayama, Japan, assignors to Sando Iron Works Co., Ltd., Wakayama, Japan**

**Filed Feb. 1, 1978, Ser. No. 874,157**
**Claims priority, application Japan, Apr. 5, 1977, 52-38788**
**Int. Cl.[2] D06M** *1/02*
**U.S. Cl. 68—9** **1 Claim**



1. An apparatus for continuous mercerizing a circular knitted article comprising: an alkali solution treating section containing a plurality of alkali solution vessels in a multistage arrangement each of which vessel is provided therewithin with guide rolls disposed alternately in zigzag position in a vertical direction and an air injection pipe for supplying an air blast to expand said article upon leaving the solution within the vessel, a pair of pressure-rolls downstream of each air injection pipe for loading tension on said expanded article in the transverse direction thereof and a pair of pinch rolls downstream of each pair of pressure rolls for squeezing out treating solution; a timing treatment section composed of a number of guide rolls disposed in a plurality of rows for subjecting said squeezed article to a reaction treatment; an alkali solution recovering section containing a plurality of water filled vessels in a multistage arrangement for recovering alkali solution each of which vessel is provided therewithin with an air injection pipe for expanding said knitted article, ring shower pipes downstream of each vessel for spraying treating liquid to wash out the alkali solution impregnated within said knitted article and a pair of pinch rolls downstream of the ring shower pipes for squeezing out the water content of said knitted article; and a rinsing section containing a plurality of water filled vessels in a multistage arrangement each of which vessel is provided therewithin with guide rolls disposed alternately in zigzag position in a vertical direction and air injection pipes for spraying air blasts at the junctions between said guide rolls and the knitted article, each vessel further being provided with an air injection pipe for spraying an air blast to expand said knitted article upon leaving the water within the vessel, a pair of tentering rolls downstream of each air injection pipe for stretching the width of said expanded article in the transverse direction and a pair of pinch rolls downstream of each pair of tentering rolls for squeezing out the water content of said knitted article; and dancer rolls respectively interposed between every two vessels arranged to be adjacent to each other for adjusting the tension loaded on said knitted article.

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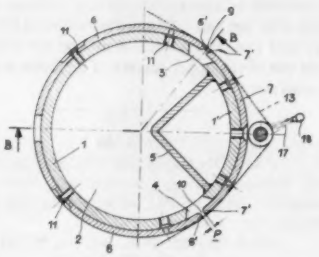
**4,166,368**

## SUCTION DEVICE FOR REMOVING LIQUIDS FROM MACHINE-TREATED TEXTILES

**Marcello Eeninca', Arzignano, and Mario Lora, Valdagno, both of Italy, assignors to Rimar Meccanica S.p.A., Carpendolo, Italy**

**Filed Jan. 17, 1978, Ser. No. 870,182**
**Claims priority, application Italy, Jan. 18, 1977, 5107 A/77**
**Int. Cl.[2] D06B** *1/02, 15/04*
**U.S. Cl. 68—20** **5 Claims**



1. Suction device for removal of liquids from textile fabrics subjected to washing, sizing and the like treatments, said device comprising:

a tubular body defining an axial suction conduit for connection to a central suction unit;

at least two passages in the said body, said passages being radial, longitudinal and angularly spaced from one another;

at least three cylindrical sectors attached on the outer surface of said body to define with their respective contiguous borders at least two longitudinal slots in juxtaposition with said passages;

a roller positioned externally of said body and between said slots for advancing said fabric past said slots.

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**4,166,369**

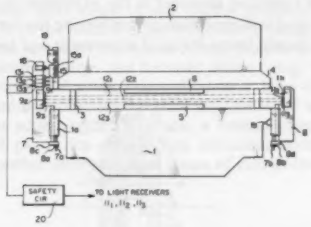
## SAFETY DEVICE FOR PRESS BRAKE

**Masanobu Nakajima, Komatsu, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan**

**Filed Apr. 6, 1978, Ser. No. 894,176**
**Int. Cl.[2] B21D** *55/00*
**U.S. Cl. 72—26** **3 Claims**

1. In a press brake for bending a workpiece between a lower die mounted on a lower beam of the press brake and a punch mounted on the lower face of a slide, a safety device comprising light projector means mounted through a first bracket on one side of said lower beam; light receiver means mounted through a second bracket on the other side of the lower beam so as to form a plurality of light beams extending horizontally between said punch and said workpiece, said light beams being located a predetermined distance apart from the centre line of descent of said punch on the side of the operator; a safety circuit means adapted to stop the operation of the press brake immediately when any of said light beams are interrupted by an operator's hand or finger; and a detector means connected

between said safety circuit means and said light receiver means, said detector means being adapted to be actuated imme-



diately before the interruption of said plurality of light beams by the punch thereby opening said safety circuit and allowing the operation of the press brake to continue.

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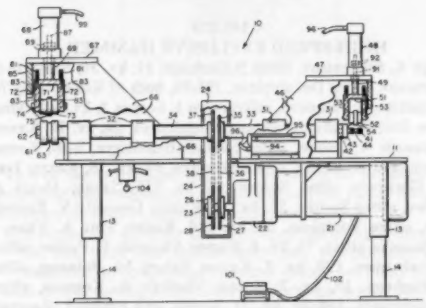
**4,166,370**

## TANDEM ROLL GROOVER

**James M. Goodman, East Rochester, N.Y., assignor to E.G.S Manufacturing Corp., East Rochester, N.Y.**

**Filed Mar. 31, 1978, Ser. No. 892,383**
**Int. Cl.[2] B21D *17/04***
**U.S. Cl. 72—105** **7 Claims**



1. A tandem roll grooving device for grooving thin walled pipe of various diameters, comprising

a base,

a pair of spaced shafts mounted on said base for rotation independently of each other about stationary axes,

a drive motor on said base,

means connecting both of said shafts to said motor to be driven thereby simultaneously,

a first backup roll secured to and projecting coaxially beyond one end of one of said shafts for rotation thereby,

a second backup roll secured to and projecting coaxially beyond one end of the other of said shafts for rotation thereby,

a pair of spaced, rotatable grooving rolls, and

stationary means fixed on said base and supporting said grooving rolls for vertical movement above said backup rolls, each of said grooving rolls having on its periphery a circumferential boss registering with a groove in one of said backup rolls for operative engagement with a section of thin walled pipe positioned thereover,

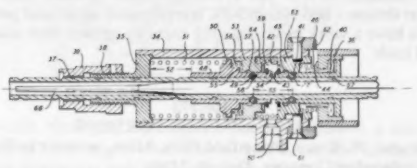
one of said backup rolls being annular in configuration, the other of said backup rolls being a solid cylindrical member, and each of said backup rolls being supported during a grooving operation solely by said one end of the shaft to which it is secured.

**4,166,371**

## EXPANDER HAVING AUTOMATIC STEPPING FEATURE

**Manfred Hauschke, Im Goldgrund 4, Munnerstadt, Fed. Rep. of Germany (8732), and Volker Meissner, Fasanenweg 13, Remscheid, Fed. Rep. of Germany (5630)**

**Filed May 12, 1978, Ser. No. 905,509**
**Claims priority, application Fed. Rep. of Germany, May 13, 1977, 2721622**
**Int. Cl.[2] B21D *39/06***
**U.S. Cl. 72—122** **9 Claims**



1. A tube expander including a housing; a generally cylindrical cage movably supported within said housing and having an axially extending bore, and a plurality of equally spaced circumferential grooves extending about a peripheral surface thereof; and a mandrel movably disposed within said bore, further comprising:

indexing means to axially advance the cage relative to the housing in a step by step manner, including first and second piston assemblies, each having first and second operating positions, with the assemblies, when in their first operating positions, locking the cage axially relative to said housing, and when in their second operating positions, advancing the cage axially a predetermined distance relative to the housing;

a first force selectively applied to the first and second piston assemblies to move the assemblies from their first operating positions to their second operating positions: and

opposing force means to return the first and second piston assemblies to their first operating position when application of the first force thereto is terminated.

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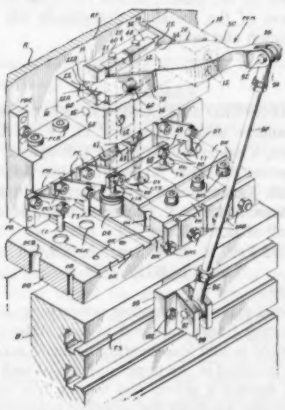
**4,166,372**

## MULTI-STATION TRANSFER PRESS HAVING PUNCH EXTENDING MEANS

**David W. Knight, Stratford, Conn., assignor to The U.S. Baird Corporation, Stratford, Conn.**

**Filed May 12, 1978, Ser. No. 905,373**
**Int. Cl.[2] B21D *22/00***
**U.S. Cl. 72—348** **19 Claims**



1. A multi-station metal forming press comprising: a single

reciprocating ram; a plurality of tools carried by said ram is fixed positions relative thereto and individually being disposed at the stations, said tools being mounted for simultaneous movement with said ram jointly the same linear distance, whereby the maximum amount of linear movement of said ram and said tools is limited by the inherent configuration of said press thereby limiting the length of work piece drawing capacity of said tools; a transfer means for carrying a work piece sequentially in a predetermined manner to each station; an additional pair of tools at two of the stations; and means mounting said additional pair of tools on said ram for simultaneous movement therewith but a linear distance greater than the linear distance said ram moves, whereby said additional pair of tools have a work piece drawing capacity greater than that of said tools.

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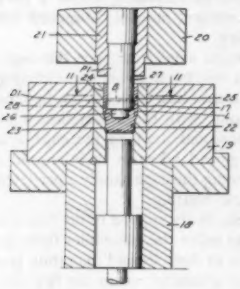
**4,166,373**

## METHOD OF COLD FORMING

**Frederick W. Braun, Bloomfield Hills, Mich., assignor to Braun Engineering Company, Detroit, Mich.**

**Filed Dec. 27, 1977, Ser. No. 864,544**
**Int. Cl.[2] B21D *22/00***
**U.S. Cl. 72—356** **6 Claims**



1. A method of cold extruding a part having a cylindrical outer surface and a hollow interior with a polygonal contour which comprises forming a preparatory hollow blank having outwardly protruding lobes, placing said blank in an extrusion die having a cylindrical cavity smaller in diameter than the lobe diameter, inserting a punch of polygonal exterior contour with the flats on said punch in alignment with said lobes, applying pressure to move said punch first into contact with said blank and then to force said blank into the die thereby moving the metal from said lobes inwardly into the cavities adjacent the flats on the punch, and at the same time causing reverse extrusion of the metal to completely fill the space between said punch and said die.

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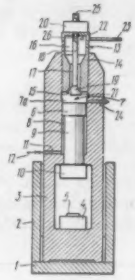
**4,166,374**

## HIGH-SPEED EXPLOSION HAMMER

**Georgy K. Stepantsov, ulitsa Belinskogo, 21, kv. 36, Kazan; Jury N. Bloschitsyn, Yasenevo, mikroraion 1, korpus 1, podiezd 3, kv. 141, Moscow; Alexandr A. Babko, ulitsa Sotsialisticheskaya, 3, kv. 20, Kazan; Ferdinand K. Kutlin, ulitsa Mirnaya, 61, kv. 75, Kazan, and Ivan V. Glazunov, ulitsa Serova, 35, kv. 136, Kazan, all of U.S.S.R.**

**Filed Feb. 16, 1978, Ser. No. 878,460**
**Int. Cl.[2] B21J *7/26***
**U.S. Cl. 72—430** **6 Claims**

1. A high-speed explosion hammer comprising: a stationary bed; a load-bearing frame mounted in said stationary bed; a lower die mounted in said load-bearing frame to accomodate a blank; a piston installed in the upper portion of said load-bearing frame and having a piston rod with a free end thereof facing the lower die; an upper die arranged coaxially with said lower die at the free end of said piston rod; an explosion device arranged over said piston in an upper portion of said load-bearing frame for causing said piston with the upper die to move during the treatment of the blank; an upper piston chamber defining an explosion chamber of said explosion device; an igniter of explosive mounted in the explosion chamber; a hollow casing of said explosion device having the form of a sleeve mounted in said frame for axial adjustment and having an open



end defining the explosive chamber; an inner space of said casing being communicatable with said explosion chamber; a check valve in said inner space for establishing communication thereof with said explosion chamber during the admission thereto of granular explosive fed along a conduit and for closing the chamber upon a blow-up which is effected by application of voltage to the igniter.

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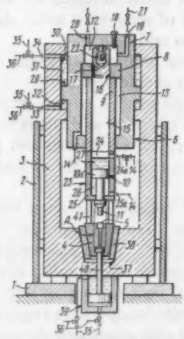
**4,166,375**

## HIGH-SPEED EXPLOSIVE HAMMER

**Georgy K. Stepantsov, ulitsa Belinskogo, 21, kv. 36; Valentin S. Abramov, ulitsa Dekabristov, 191-91, both of Kazan; Jury N. Bloschitsyn, Yasenevo, mikroraion 1, korpus 1, kv. 141, Moscow; Raif R. Zaripov, ulitsa Gvardeiskaya, 24, kv. 74, Kazan; Alexandr A. Babko, ulitsa Sotsialisticheskaya, 3-20, Kazan; Ferdinand K. Kutlin, ulitsa Mirnaya, 61, kv. 75, Kazan; Ivan V. Glazunov, ulitsa Serova, 35, kv. 136, Kazan; Alexei A. Nilov, ulitsa Serova, 35, kv. 17, Kazan; Gennady V. Kuznetsov, ulitsa Vosstania, 56, kv. 114, Kazan; Petr A. Viter, 4 Sojuznaya ulitsa, 71, kv. 2, Kazan; Alexandr F. Pavlov, ulitsa Dekabristov, 199, kv. 2, Kazan; Valery M. Belonog, ulitsa Belinskogo, 19, kv. 7, Kazan; Vladimir A. Korneev, ulitsa Dekabristov, 164/31, kv. 71, Kazan, and Emilia I. Zvereva, ulitsa Oktyabrskaya, 15, kv. 17,, Kazan, all of U.S.S.R.**

**Filed Mar. 28, 1978, Ser. No. 891,151**
**Int. Cl.[2] B21J *7/26***
**U.S. Cl. 72—430** **13 Claims**



1. A high-speed explosive hammer comprising: a stationary bed; a load bearing frame incorporated in said bed; a lower die mounted in said load bearing frame; a main hammer cylinder mounted in said load bearing frame and having a piston with a

hollow piston rod having an inner space, and an upper chamber comprising an explosion chamber; a hammer body coaxial with said lower die on said hollow piston rod; an upper die mounted on said hammer body; said hammer body being mounted in said inner space of said hollow piston rod for an independent axial movement relative thereto; a hammer piston accommodated in said inner space of said hollow piston rod above said hammer body; said hammer piston being caused to move by pressure of gases released upon a blow-up in the explosion chamber to cause the axial movement of said hammer body for acting upon the blank; a central opening provided in said piston for establishing communication of said explosion chamber with the inner space of said hollow piston rod.

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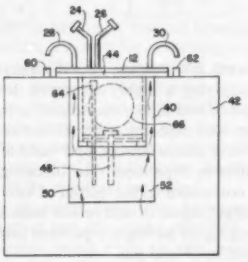
**4,166,376**

## FLUIDIZED SOLIDS PARTICLE DISCHARGE DEVICE

**Joseph T. Callahan, 131 Heath Rd., Medford, N.J. 08055, and Charles R. Delp, 415 Juniper St., Carlisle, Pa. 17013, assignors to Joseph Callahan, Medford, N.J. and Charles Delp, Carlisle, Pa.**

**Filed Apr. 17, 1978, Ser. No. 896,809**
**Int. Cl.[2] G01C *25/00***
**U.S. Cl. 73—1 F** **10 Claims**




10. For use in fluidized solid particulate baths for subjecting portions of instrumentation, equipment and the like to temperature controls therein, apparatus comprising:

first means for securing said instrumentation, equipment and the like such that substantially only the portions to be subjected to temperature control extend into said bath;

said means having a first member through which said portions extend, and forming a mechanical barrier to penetration by solid particulates of said bath;

and said means also having a second, thermal insulation member adjacent said first member on a side nearer said instrumentation, equipment and the like and through which said portions also extend, said second member forming a thermal insulating barrier to insulate the remainder of said instrumentation, equipment and the like from the temperatures of said fluidized bath.

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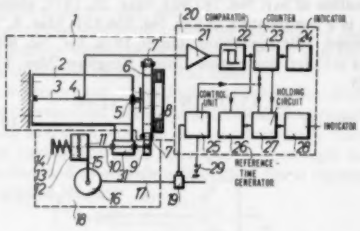
**4,166,377**

## APPARATUS FOR MEASURING THE DAMPING COEFFICIENT OF TORSIONAL-VIBRATION DAMPERS

**Imre Z. Szabó; Kornél Nagy, and Csaba Finta, all of Győr, Hungary, assignors to Magyar Vagon- és Gépyár, Győr, Hungary**

**Filed Apr. 20, 1977, Ser. No. 789,095**
**Claims priority, application Hungary, Apr. 27, 1976, MA 2765**
**Int. Cl.[2] G01M *13/00***
**U.S. Cl. 73—11** **9 Claims**

1. An apparatus for quickly checking the damping coefficient of torsional-vibration dampers that are filled with a viscous liquid and are provided with a swing ring, comprising, in combination: at least one torsional vibration system (1); each having a torsional shaft (3) fixed (2) at one end and supported at the other end; a disc (6) fixed to said shaft and secured against turning; a roller (7) supported on a rim of said disc; at least one mechanism (18) for producing free oscillation with damping and being provided with a source (16) supplying energy, connected to said roller; said mechanism including a




cam-disc shaft (10) connected to said roller; and a sensing element (4) arranged on said shaft and connected to an electronic evaluation unit (20), for sensing the oscillations of said shaft.

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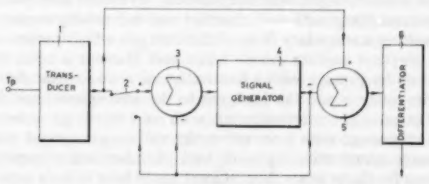
**4,166,378**

## METHOD AND APPARATUS FOR THE DIFFERENTIAL THERMAL ANALYSIS OF A MOLTEN METAL

**Peter Berger, Düsseldorf-Benrath; Milan Lampic, Kaarst; Jörg Müsseldorf-Wersten, and Kurt Orths, Ratingen, all of Fed. Rep. of Germany, assignors to Verein zur Förderung der Giesserei-Industrie, Düsseldorf, Fed. Rep. of Germany**

**Filed Dec. 22, 1977, Ser. No. 863,328**
**Int. Cl.[2] G01N *25/04***
**U.S. Cl. 73—15 B** **13 Claims**




1. Apparatus for thermally analyzing a metal as the metal cools, comprising:

(a) temperature converting means for converting the decreasing temperature of the metal into corresponding electrical signals that are indicative of the temperature at any one time;

(b) a signal generator for generating an adjusted variable signal that corresponds to Newton's law of cooling equations for the metal being analyzed, wherein said equations contain preselected parameters,

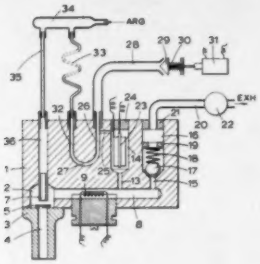
said signal generator comprising adjusting means responsive to an error signal for adjusting the parameters in said variable signal so that said variable signal corresponds to the cooling equations for the metal being analyzed;

(c) and comparing means for comparing said adjusted variable signal with said electrical signals indicative of the temperature of the metal to supply an error signal to said adjusting means representative of the difference between said variable and electrical signals.

## 4,166,379
## APPARATUS FOR THE DETECTION OF VOLATILE ORGANIC SUBSTANCES

**Robert F. D. Bradshaw, Cambridge, England, assignor to Pye Limited, Cambridge, England**

**Continuation of Ser. No. 781,933, Mar. 28, 1977, abandoned, which is a continuation of Ser. No. 664,531, Mar. 8, 1976, abandoned. This application Jan. 9, 1978, Ser. No. 868,064**
**Claims priority, application United Kingdom, Mar. 11, 1975, 10054/75**
**Int. Cl.[2] G01N *27/62, 31/06***
**U.S. Cl. 73—23** **10 Claims**



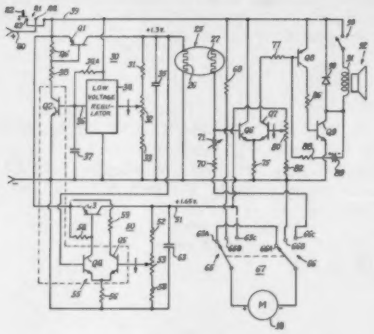
1. An apparatus for detecting a volatile organic substance contained in a gaseous mixture, comprising: (a) a chamber and an electron capture device disposed in said chamber of said apparatus, (b) a heatable filament which adsorbs, when cold, said volatile organic substance and when heated, releases said substance to said electron capture device, said apparatus further comprising a duct containing said filament, said duct communicating with said chamber, (c) a first inlet passage with a first inlet valve to admit a quantity of said mixture into the apparatus, said first inlet valve communicating with said duct and comprising means for opening said first inlet valve when the pressure in the apparatus is less than the ambient pressure and to close when the pressure in the apparatus exceeds the ambient pressure, (d) a second inlet passage that communicates with said duct and comprises means for admitting a primary flow of an inert gas over said filament, (e) a third inlet passage communicating with said chamber and comprising means for admitting a secondary flow of the inert gas which passes over the electron capture device when said filament is cold, (f) a first outlet passage with a first outlet valve to exhaust the gas under analysis and the inert gas to the atmosphere, said first outlet passage communicating with said duct. (g) a second outlet passage with a second outlet valve, said second outlet passage communicating with said chamber and comprising means for the primary flow of inert gas to take volatile components released from the filament when heated to the electron capture device, (h) means to open said first outlet valve of said first outlet passage when the pressure in the apparatus exceeds the ambient pressure, and (i) means to open said second outlet valve of said second outlet passage, the presence of one or more of the volatile organic substances being detected by a change in an output signal from the electron capture device.

## 4,166,380
## QUANTITATIVE MEASURING SYSTEM FOR COMBUSTIBLE GAS WITH AUDIBLE TICK RATE

**James E. Batz, Northbrook, Ill., assignor to Northern Illinois Gas Company, Aurora, Ill.**

**Filed Feb. 23, 1978, Ser. No. 880,697**
**Int. Cl.[2] G08B *17/10*; G01N *31/00***
**U.S. Cl. 73—23** **7 Claims**

1. Apparatus for measuring combustible gas comprising: semiconductor sensor means including a heater element and a collector electrode, the resistance between said element and said electrode decreasing with an increasing concentration of combustible gas in an atmosphere in which said sensor means is placed for generating an output signal representative of said concentration; a source of electrical energy; a meter; calibration circuit means for calibrating the output signal of said sensor means; means for connecting said meter in circuit with said collector electrode of said sensor means and said calibration means for measuring the current through said sensor means, said current being a reliable quantitative measure of the concentration of combustible gas detected by said sensor

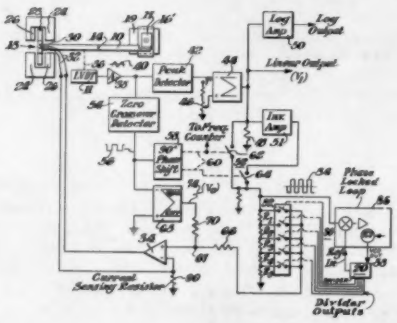


means; regulated, low voltage circuit means connected to said source for supplying a highly regulated, low voltage to said heater element of said sensor means and to the circuit comprising said meter, said calibration circuit means and said collector electrode of said sensor means; and audible circuit means including a variable repetition rate blocking oscillator and a loudspeaker connected to the output of said oscillator responsive to the output signal of said sensor means for generating an audible ticking signal having a repetition rate representative of the concentration of said gas.

## 4,166,381
## APPARATUS FOR DETERMINING THE VISCOSITY OF FLUIDS

**Lecon Woo, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Feb. 24, 1978, Ser. No. 880,943**
**Int. Cl.[2] G01N *11/00***
**U.S. Cl. 73—54** **7 Claims**



1. An apparatus for the measurement of the viscosity of fluid materials comprising, in combination:
a fixed plate;
a flexible vibratory means;
a movable plate mounted on said vibratory means for vibratory movement in a plane parallel to the plane of said fixed plate;

said plates being parallel and spaced apart to receive said fluid materials therebetween;
drive means for maintaining said vibratory means in vibration at its resonant frequency using a sinusoidally varying driving force; and
means for measuring said driving force.

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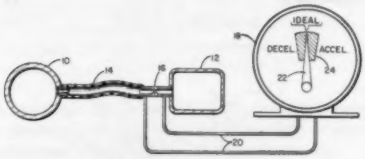
**4,166,382**
**AUTO ECONOMY GAUGE**
**Paul S. Petersen, 2200 Windsor Lake Dr., Minnetonka, Minn. 55343**
**Filed Mar. 27, 1978, Ser. No. 890,083**
**Int. Cl.[2] G01M** *15/00*
**U.S. Cl. 73—115** **4 Claims**




1. For use in vehicles having an internal combustion engine with an intake manifold, a system for permitting a driver of the vehicle to evaluate whether he is operating the vehicle in a fuel-efficient manner, the system comprising:
means forming an independent undivided closed volume chamber separate from the intake manifold;
means connecting the closed volume chamber and the intake manifold to permit fluid flow between the closed volume chamber and intake manifold including:
a fixed orifice to meter fluid flow between the closed volume chamber and the intake manifold, said closed volume chamber being open to said intake manifold only through said orifice;
differential pressure detecting means for detecting differential pressures across the fixed orifice; and
display means for visually displaying a direct indication of the differential pressure detected across said fixed orifice.

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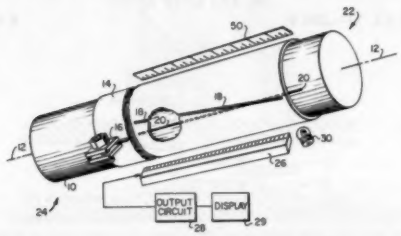
**4,166,383**
**OPTICAL SHAFT TORQUE METER**
**James M. Lapeyre, New Orleans, La., assignor to The Laitram Corporation, New Orleans, La.**
**Filed Mar. 20, 1978, Ser. No. 888,480**
**Int. Cl.[2] G01L** *3/12*
**U.S. Cl. 73—136 A** **6 Claims**




1. A torque meter for providing an indication of the torque applied to a cylindrical shaft comprising:
a single sleeve disposed around a shaft and extending along a predetermined axial length thereof;
means securing one end of said sleeve to said shaft for rotation therewith;
the other end of said sleeve being rotatable with respect to said shaft;
an aperture provided in the wall of said sleeve and extending along the length of the sleeve;
a marker on the surface of said shaft and having a portion visibly sensible through said aperture;
said aperture and said marker being angularly disposed with respect to each other; and
electro-optical means for indicating the relative position of the marker visible through said aperture and representative of torque applied to said shaft;
said electro-optical means including means for illuminating said aperture and an elongated photosensor array disposed along said shaft adjacent to and substantially coextensive with said aperture and operative to sense light from said aperture and to provide an electrical signal representative of applied torque.

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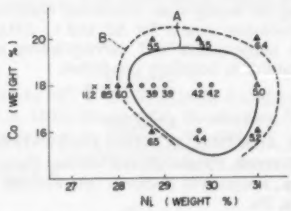
**4,166,384**
**SEMICONDUCTOR TRANSDUCER**
**Yasumasa Matsuda; Kazuji Yamada; Satoshi Shimada, all of Hitachi; Motohisa Nishihara, Katsuta; Tomio Yasuda, Hitachi; Masatoshi Tsuchiya, Hitachi; Ko Soeno, Hitachi; Mitsuo Ai, Katsuta; Takeo Nagata, Hitachi, and Yoshitaka Matsuoka, Mito, all of Japan, assignors to Hitachi, Ltd., Japan**
**Filed Sep. 6, 1978, Ser. No. 940,077**
**Claims priority, application Japan, Sep. 7, 1977, 52-107439**
**Int. Cl.[2] G01L** *1/04, 1/18*
**U.S. Cl. 73—141 A** **4 Claims**




1. A semiconductor transducer comprising a cantilever yielding a strain in response to the impartation of a force or displacement, said cantilever being manufactured from a block of an iron-nickel-cobalt alloy subjected to standard heat treatment including heating the block up to a temperature above 600° C. for removing its internal strain, at least one pair of semiconductor strain gauge units exhibiting a piezoresistive effect, said semiconductor strain gauge units being bonded to at least one of the surfaces of said cantilever, and a die member fixedly supporting said cantilever thereon, wherein said block providing said cantilever is subjected to cold working at a working rate of more than and including 60% after said standard heat treatment and is then subjected to heat treatment at a temperature between 350° C. and 600° C.

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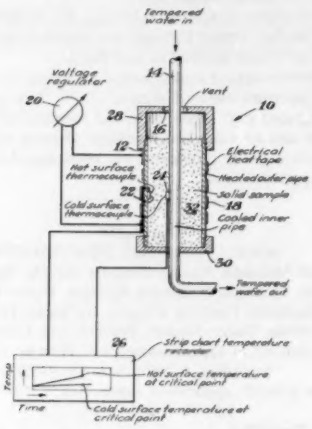
**4,166,385**
**NON-ADIABATIC REACTION CALORIMETRIC TECHNIQUE**
**Kevin T. Pate, Midland, and Edward E. Timm, Coleman, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.**
**Filed Jun. 28, 1978, Ser. No. 919,885**
**Int. Cl.[2] G01K** *17/00*
**U.S. Cl. 73—190 R** **1 Claim**

1. The method of quantifying the kinetic constants $\Delta E$, the activation energy, and $(-\Delta H_R)a$, the product of heat of reaction and Arrhenius pre-exponential factor, for a given thermally unstable solid, comprising the steps of:
(1) locating a sample between controlled hot and cold surfaces, and applying a first known thermal gradient to the sample;
(2) gradually raising the temperature of the hot surface to

determine the maximum temperature that the sample can withstand without undergoing a thermal runaway, and defining that temperature as the critical temperature for that applied gradient;

(3) repeating steps (1) and (2) at a second and different known applied thermal gradient, to obtain a second and different critical temperature; and

(4) solving the steady-state differential equation describing the calorimeter system for $\Delta E$ and $(-\Delta H_R)a$ using the critical temperatures and corresponding cold surface temperatures as boundary conditions.

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**4,166,386**

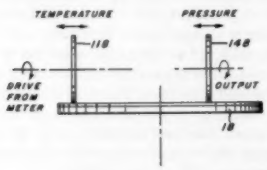
**WHEEL AND DISC CONTINUOUS INTEGRATOR**

**Edward C. Warrick, Pittsburgh, and Michael Davis, White Oak, both of Pa., assignors to Rockwell International Corporation, Pittsburgh, Pa.**

**Continuation of Ser. No. 739,436, Nov. 8, 1976, abandoned. This application Dec. 19, 1977, Ser. No. 861,595**

**Int. Cl.[2] G01F** *15/02*

**U.S. Cl. 73—194 R** **3 Claims**




1. Apparatus for indicating the volume of fluid flow through a meter in a pipeline comprising a first drive element mounted for rotation about its axis, a second drive element mounted for rotation about its axis, one of said elements being a wheel having serrations formed on its periphery, the other being a variable drive radius element having a drive surface formed of a material characterized by low compression set and high resistance to abrasion, a third drive element mounted for rotation about its axis, one of said first and third drive elements being a variable drive radius element having a drive surface formed of a material characterized by compression set of no greater than 35% as measured by ASTM Test D395 Method B and high resistance to abrasion, the other being a wheel having serrations formed in its periphery, said first and second drive elements being in drive engagement, and said first and third drive elements being in drive engagement, means to adjust the point of engagement between said first and second drive elements to vary the drive ratio therebetween in accordance with one physical condition of the fluid flowing through said meter, means to adjust the point of engagement between said first and third drive element in accordance with variations in a second physical condition of said fluid, and means to drive connect said second drive element with the output of said meter.

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**4,166,387**

**FLOW MONITORING**

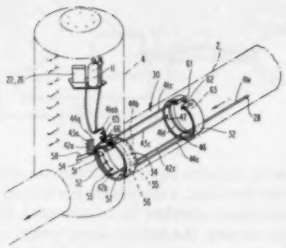
**Charles A. McClure, 5 Laurel Circle, Malvern, Pa. 19355**

**Continuation of Ser. No. 724,979, Sep. 20, 1976, Pat. No. 4,104,914. This application Jan. 3, 1978, Ser. No. 866,635**

**The portion of the term of this patent subsequent to Aug. 8, 1995, has been disclaimed.**

**Int. Cl.[2] G01F** *1/00*

**U.S. Cl. 73—194 F** **11 Claims**



11. In measurement of liquid flow rate within an open conduit by injection of electrically conductive fluid thereinto and measurement of the time required for it to be carried by the flowing liquid a given distance downstream, the improvement comprising forming an electrically conductive liquid layer oriented transversely of the conduit by transverse injection of the electrically conductive fluid thereinto and detecting the increased conductivity of the liquid layer downstream of the injection location as the body of liquid carries it thereby.

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**4,166,388**

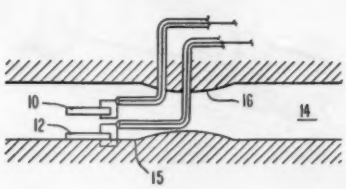
**RF ADMITTANCE MEASURING METHOD AND APPARATUS FOR DETERMINING THE LEVEL OF A CONDUCTIVE LIQUID**

**Robert J. Sun, Bala Cynwyd, and Frederick L. Maltby, Jenkintown, both of Pa., assignors to Drexelbrook Controls, Inc., Horsham, Pa.**

**Division of Ser. No. 532,208, Dec. 12, 1974, Pat. No. 4,064,753. This application Dec. 12, 1977, Ser. No. 859,475**

**Int. Cl.[2] G01F** *23/26*

**U.S. Cl. 73—304 R** **8 Claims**




1. A probe system for measuring the level of a liquid comprising:

a vessel having a wall;

a probe including a conductive probe electrode extending longitudinally along the probe and insulation covering said probe electrode;

track means in the vessel adapted to removably receive the probe; and

a groove associated with said track means and said probe for guiding the probe along a predetermined path.

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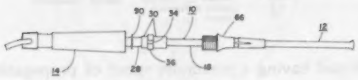
**4,166,389**

## ELECTRONIC THERMOMETER PROBE ASSEMBLY

**William T. Montren, Bayshore, N.Y., assignor to Arbrook, Inc., Arlington, Tex.**

**Filed May 3, 1978, Ser. No. 902,345**
**Int. Cl.² G01K *13/00, 7/22***
**U.S. Cl. 73—343 R** **19 Claims**



1. An electronic thermometer probe assembly, comprising:

(a) an electrical element for sensing temperature and varying an electrical characteristic in response thereto;

(b) a resilient flexible shaft formed of plastic such that it is of a durable and lightweight construction, said electrical element being mounted at one end of said shaft;

(c) a probe handle connected to the other end of said flexible shaft and extending coaxially therefrom, said handle having an axially displaceable portion;

(d) a probe cover retainer secured to said axially displaceable portion of said probe handle and having an axial bore therethrough, said flexible shaft extending through said bore, whereby a generally cylindrical probe cover may be positioned over said flexible shaft and into engagement with said cover retainer with the probe cover being releasable subsequent to usage thereof by sliding said axially displaceable handle portion in a direction away from the probe cover so as to cause said flexible shaft to be placed slightly in compression and said cover to be axially projected a slight distance upon release thereof from said retainer to facilitate disposal of said cover.

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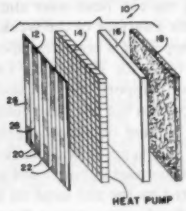
**4,166,390**

## SCANNING RADIOMETER APPARATUS

**Theodor H. Benzinger, 6607 Broxburn Dr., Bethesda, Md. 20014**

**Filed Oct. 3, 1977, Ser. No. 838,783**
**Int. Cl.² G01J *5/12***
**U.S. Cl. 73—355 R** **9 Claims**



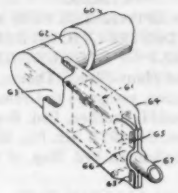

1. A scanning radiometer comprising a series of laminations forming a tightly bonded sandwich structure including at least four laminar components each being insulated electrically from the adjacent one yet disposed in best conditions possible for thermal contact therewith, and such series including (a) two surface thermometers, one absorptive, the other reflective of thermal radiation forming an interwoven pattern of alternating absorptive and reflective surfaces, (b) a heat pump for transfer of heat between the surface thermometers and a heat sink, (c) a heat sink functioning material, and (d) an insulator functioning material.

**4,166,391**

## MOLTEN METAL SAMPLER

**Robert F. McDevitt, Box 551, Ogden Dunes, Portage, Ind. 46368**

**Continuation-in-part of Ser. No. 768,711, Feb. 15, 1977, abandoned, which is a continuation-in-part of Ser. No. 720,697, Sep. 7, 1976, Pat. No. 4,112,772, which is a continuation of Ser. No. 565,396, Apr. 7, 1975, abandoned. This application May 18, 1978, Ser. No. 907,110**
**Int. Cl.² G01N *1/12***
**U.S. Cl. 73—425.4 R** **23 Claims**



1. An elongated casing having one extremity formed to provide end wall structure providing a relatively small center tubular formation and an opposite open extremity for accommodating an elongated sampling device having an extended tubular entrance in a manner whereby the device can be moved in the casing to locate the entrance through the formation for use.

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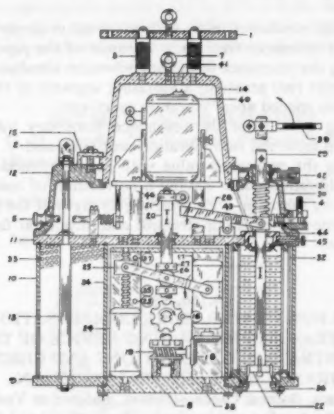
**4,166,392**

## AUTOMATIC WATER/SEWER SAMPLER

**Cecil Farnworth, 31010 Bingham Rd., Birmingham, Mich. 48010**

**Filed Jun. 9, 1978, Ser. No. 914,121**
**Int. Cl.² G01N *1/12***
**U.S. Cl. 73—425.4 R** **6 Claims**



1. In a water/sewer sampling device of the type adapted to be lowered into a body of liquid, a particular water-tight construction which consists of three major elements,

(A) a 'lower chamber assembly', which consists of a lower plate, an upper plate, and inner and outer tubular walls which seal to both top and bottom plates to create an annular cavity in which a plurality of integral sample collector flasks are equally spaced inside the periphery of the outer shell and outside the periphery of the inner shell,

(B) a 'main body casing' which caps and seals the lower chamber assembly when attached by tie rods and provides an air tight sealed chamber for the operating mechanisms

which open and close each station sample flask valve in timed sequence,

(C) a 'battery housing' which fits into an opening in the upper face of the main body casting and is secured in a water tight manner by clamp brackets providing space for a battery power source and the timing mechanism, whereby the aforementioned units are assembled for immersion in a test site liquid, the complete unit can be lifted or suspended by engaging a single eye bolt attached to a system of plate and cable sling supports.

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**4,166,393**

## PROCESS AND APPARATUS FOR AUTOMATIC, CONTINUOUS, DESTRUCTION-FREE CHECKING, ESPECIALLY OF STONEWARE PIPES

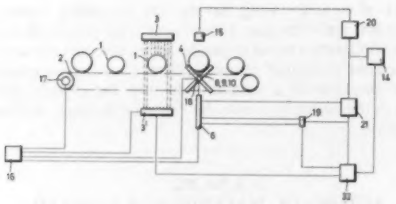
**Hans A. Lindner, and Hans-Jürgen Thoma, both of Rodental, Fed. Rep. of Germany, assignors to Cremer & Breuer Keramische Betriebe GmbH, Frechen, Fed. Rep. of Germany**

**Filed Jun. 21, 1977, Ser. No. 808,655**

**Claims priority, application Fed. Rep. of Germany, Jun. 23, 1976, 2628178**

**Int. Cl.[2] G01N *29/00***

**U.S. Cl. 73—579** **17 Claims**



1. A process for a non-destructive continuous automatic quality control system of monitoring a stoneware pipe and like objects, said process comprising:

positioning the pipe for support on at least one vibration node;

exciting the positioned pipe with a vibration generator to obtain a resonance frequency vibration of the pipe;

measuring the resonance frequency vibration simultaneously on at least two points of a vibrating segment of the pipe with two spaced apart vibration receivers;

registering a value of the resonance frequency vibration obtained from the two vibration receivers; and

comparing the registered value with predetermined values of a calibration curve having a correlation of resonance frequency vibration with crushing strength of the pipe to determine the crushing strength and structural faults of the pipe.

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**4,166,394**

## METHOD FOR TEMPERATURE COMPENSATION OF AN ULTRASONIC MEASURING DEVICE OF THE CONCENTRATION OF SOLUTIONS AND CIRCUIT ARRANGEMENT FOR ITS EXECUTION

**Zdenko Figura, Bosaca, Czechoslovakia, assignor to Vyskumny ustav mechanizacie a automatizacie, Nove Mesto nad Vahom, Czechoslovakia**

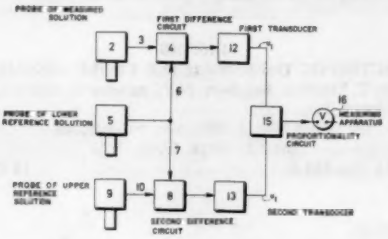
**Filed Jun. 22, 1977, Ser. No. 808,911**

**Claims priority, application Czechoslovakia, Jun. 30, 1976, 4301-76**

**Int. Cl.[2] G01N *29/02***

**U.S. Cl. 73—597** **3 Claims**

1. A method for temperature compensation of an ultrasonic measuring device of the concentration of solutions, said method comprising the steps of determining the difference between time intervals obtained due to the speed of propagation of ultrasonic waves in a measured liquid with respect to a first reference liquid with a minimum speed of propagation of ultrasonic waves, determining the difference between time intervals obtained due to the speed of propagation of ultrasonic waves in said first reference liquid with respect to a further




reference liquid having a maximum speed of propagation of ultrasonic waves, and by subsequently dividing these difference values.

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**4,166,395**

## TEST HEAD HOLDER IN A TEST SYSTEM CARRIER, PREFERABLY FOR ULTRASONIC TEST HEADS

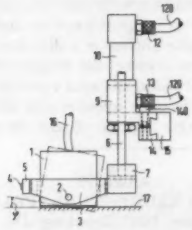
**Günther Dannehl, Dietzenbach, Fed. Rep. of Germany, assignor to Kraftwerk Union Aktiengesellschaft, Mülheim, Fed. Rep. of Germany**

**Filed Dec. 5, 1977, Ser. No. 857,701**

**Claims priority, application Fed. Rep. of Germany, Dec. 6, 1976, 2655179**

**Int. Cl.[2] G01N *29/04***

**U.S. Cl. 73—634** **5 Claims**

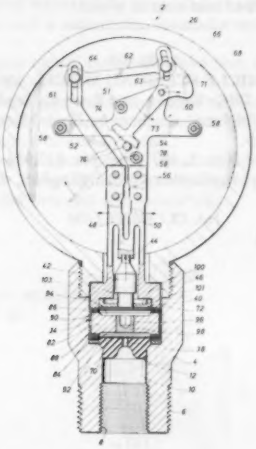


5. In a test system carrier having a test head for non-destructive testing of a workpiece, a test head holder comprising means for moving the test head over and means for pressing the test head against a surface of the workpiece, said test-head pressing means comprising a compressed-air cylinder having a piston, a support body for supporting the test head, gimbal means coupling said support body to said piston, said piston being actuatable to press the test head substantially perpendicularly against the surface of the workpiece and linear guide means for guiding said support body in stroke direction of the piston, in a manner that said cylinder and piston are relieved of lateral forces exerted by the test head on said support body as the test head is slidingly moved over the surface of the workpiece, wherein a multiplicity of test heads forming a test head row are supported by a carrier arm in mutual alignment, each test head having a pneumatic drive unit and including first means for equally pressing less than all of the multiplicity of test heads against the workpiece and second means for equally pressing at least one test head of the balance of the multiplicity of test heads against the workpiece, said first and second pressing means each including a separate common compressed-air supply hose connected to a separate control valve, said separate control valves being connected to a compressed-air source.

## 4,166,396
## PRESSURE INDICATING DEVICE

William E. Baker, Houston, Tex., assignor to Gauges International, Inc., Houston, Tex.

Filed Apr. 12, 1978, Ser. No. 895,776
Int. Cl.[2] G01L 7/08
U.S. Cl. 73—706 3 Claims

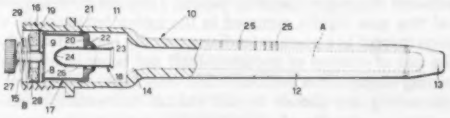


1. An apparatus for measuring fluid pressure, comprising:
a housing formed to define a receptacle;
a diaphragm assembly consisting of a pair of diaphragms maintained in spaced relationship by a diaphragm support, and cooperating with said diaphragm support to define a pair of fluid chambers separated by said diaphragm support, said diaphragm support being formed to define a central threaded opening, a threaded plug being received within said threaded opening and defining an interstitial interconnection between said fluid chambers, a substantially incompressible fluid bing contained within said fluid chambers, said diaphragm assembly defining partition means separating said receptacle into a pressure chamber and an ambient chamber, said diaphragm assembly being at least a portion of the partition means between said pressure chamber and ambient chamber and flexible in relation to said diaphragm support by pressure in said pressure chamber transmitted through said fluid within said pair of fluid chambers of said diaphragm assembly;
a face plate in fixed relation to said housing with spaced demarcations on at least one side of said face plate;
an indicator pointer being supported by a rotatable shaft that is movably positionable in relation to said face plate, the position of said indicator in relation to said demarcations on said face plate providing a visual indication of the pressure within said pressure chamber;
a generally M-shaped spring member being supported within said ambient chamber, the side portions of said spring defining spaced generally parallel prongs and the central portion of said spring being interconnected with each of said side portions and being positioned substantially centrally thereof;
a thrust element being movably positioned intermediate said side portions of said spring and engaging both said diaphragm assembly and said central portion of said spring, said thrust element being movable linearly by pressure induced flexing of said diaphragm assembly and inducing linear movement of said central portion of said spring, said linear movement of said central portion of said spring inducing opposing movement of said prongs;
a pair of extension arms being connected to respective ones of said prongs, said extension arms being relatively movable on opposing movement of said prongs;
a sector gear being pivotally supported by one of said extension arms;
a link element interconnecting the other one of said extension arms and said sector gear and causing pivotal movement of said sector gear upon relative movement of said extension arms; and
a pinion gear being nonrotatably connected to said rotatable shaft and being rotatably driven by said sector gear, thus rotating said shaft and pointer responsive to opposing movement of said extension arms.

## 4,166,397
## AIR PRESSURE GAUGE

Michele Rosso, Via Villa 122, Giaveno (Turin), Italy

Filed Apr. 27, 1978, Ser. No. 900,618
Claims priority, application Italy, Dec. 12, 1977, 69769 A/77
Int. Cl.[2] G01L 7/16
U.S. Cl. 73—744 10 Claims

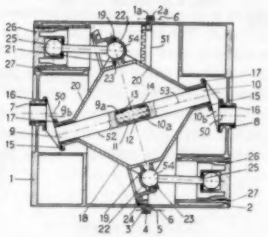


1. An air pressure gauge comprising a tube of rigid transparent material closed at one end and open at the other for connection to a source of pressure to be measured, and provided with graduated notches along its longitudinal extension, wherein the tube is constituted by at least two cylindrical portions connected together, of which a first portion is adjacent to the open end, and a second portion, of smaller diameter than the first, extends towards the closed end of the tube, a piston of yieldable resilient material sliding in said tube and being constituted by at least two separate coaxial elements of which the outer forms a seal against the inner walls of the tube portion of greater diameter and the inner forms a seal against the inner walls of the second portion of smaller diameter, the friction opposing the relative sliding between the two elements exceeding that opposing the sliding of the outer element against the inner walls of the tube portion of greater diameter.

## 4,166,398
## MULTI-CYLINDER MACHINES

Marius G. H. Girodin, "La Fontaine Peureuse", 78580 Bazemont, France

Filed Dec. 3, 1974, Ser. No. 529,217
Claims priority, application France, Dec. 5, 1973, 73 43417
Int. Cl.[2] F16H 23/00
U.S. Cl. 74—60 7 Claims



1. A machine including a casing having first and second sets of cylinders formed therein, said sets of cylinders being located in longitudinally spaced relation to each other and parallel to an axis of rotation with the cylinder in each set being located symmetrically around said axis of rotation, a plurality of pistons respectively located in said cylinders, a common motion

transmitting mechanism located in said casing between said first and second sets of cylinders, said motion transmitting mechanism including a generally "Z" shaped crankshaft having a central oblique spindle and axially aligned end extensions rotatably mounted in said casing along said axis of rotation, a motion transmitting element including two generally frusto-conical elements each having major and minor diameter portions and being rotatably mounted on the spindle of the crankshaft, with their major diameter portions adjacent each other, said frusto conical elements of said motion transmitting element comprising at least two frusto conical parts releasably interconnected along their major diameter portions at a plane located at a right angle to said spindle of the crankshaft, and thrust bearings on the ends of said oblique spindle adjacent said end extensions respectively received in the minor diameter portions of said frustro conical parts; means for connecting said pistons to said motion transmitting element; said casing being formed of at least two parts interconnected along a plane located at a right angle to said axis of rotation; a first generally conical ring gear mounted on said motion transmitting element adjacent the major diameter thereof; a second generally conical ring gear rigidly mounted in the casing between the two parts thereof in a plane extending generally perpendicularly to the axis of rotation of said crankshaft and being in continuous mating engagement with said first ring gear, said means for connecting the pistons to said motion transmitting element including a plurality of connecting rods respectively associated with each of said pistons, each of said rods having opposed ends respectively swivelably connected to its associated piston and to said motion transmitting element, each piston in each of said sets being located in a paired relation with a single corresponding piston in the other of said sets, the pistons in each pair being located in a common plane on opposite sides of said transmitting element and 180° away from each other with respect to said axis of rotation, with the slope of said frusto conical parts being selected such that the apex of each frusto conical part lies within its associated thrust bearing and the swivelable connections between said piston rods and said transformer are located along the circle defined by the intersection of said major diameter portions of the frusto conical parts, whereby the forces acting on said crankshaft and casing are substantially counterbalanced and transmitted directly through the movement transformer to the spindle and casing.

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**4,166,399**

## DRIVE DEVICE FOR THE DETACHING ROLLERS IN COMBING MACHINES

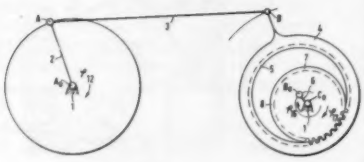
**Gerd Kiper, Springe, and Dietmar Schumann, Hanover, both of Fed. Rep. of Germany, assignors to Schubert & Salzer, Ingolstadt, Fed. Rep. of Germany**

**Filed Mar. 7, 1977, Ser. No. 775,107**

**Claims priority, application Fed. Rep. of Germany, Mar. 12, 1976, 2610314**

**Int. Cl.² G01F *23/06***

**U.S. Cl. 74—320** **8 Claims**



**1.** A drive device for the detaching rollers in a combing machine comprising:

(a) a coupling member having an inner toothed wheel rim with a central axis extending therethrough;

(b) a central wheel carried in said coupling member;

(c) a take-off shaft carried by said central wheel for driving said detaching rollers;

(d) teeth carried on said central wheel meshing with said teeth of said inner toothed wheel rim;

(e) crank arm means for driving said coupling member about a second axis offset from said central axis, and

(f) means for reciprocally rotating said coupling member as said crank means drives said coupling member about said second axis for imparting a pilgram step motion to said take-off shaft of said central wheel.

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**4,166,400**

## MOTOR VEHICLE STEERING WHEEL ASSEMBLY

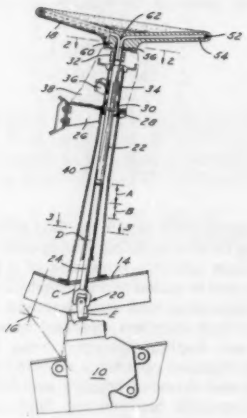
**Walter Manning, Little Baddow, and Terry G. Bradley, Chelmsford, both of England, assignors to Ford Motor Company, Dearborn, Mich.**

**Filed Nov. 2, 1977, Ser. No. 847,984**

**Claims priority, application United Kingdom, Feb. 9, 1977, 05272/77**

**Int. Cl.² B62D *1/08***

**U.S. Cl. 74—552** **6 Claims**



**1.** A steering wheel assembly comprising a wheel rim and a tubular member for use as at least part of a steering column,

the tubular member having its longitudinal axis aligned with the center of the wheel rim,

and a plurality of spokes of circular cross section each having a first portion extending from the rim transversely of said axis to a location adjacent the axis and a second portion extending parallel to said axis,

the cross section of the tubular member having a number of flat sides equal to the number of spokes and joined by radii equal to the spoke cross-sectional radius,

the second portions of the spokes being secured within the tubular member.

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**4,166,401**

## GEAR MEANS FOR CONTROL OF PLANETARIA PROJECTORS

**Helmut Bohme, and Gerhard Vogel, both of Jena, German Democratic Rep., assignors to Jenoptik Jena G.m.b.H., Jena, German Democratic Rep.**

**Filed Feb. 7, 1978, Ser. No. 870,770**

**Claims priority, application German Democratic Rep., Apr. 2, 1977, 197354**

**Int. Cl.² F16H *1/28***

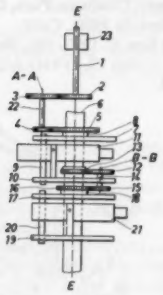
**U.S. Cl. 74—802** **1 Claim**

**1.** Gear means particularly for control of planet projectors in a planetarium,

comprising

a drive axle substantially in parallel to the ecliptic axis of the planetarium,

a first gear wheel mounted on an end portion of said drive axle,
a first driven axle being in parallel to said drive axle,
a second gear wheel meshing with said first gear wheel,
a third gear wheel and said second gear wheel being rigidly connected to said first driven axle,
a fourth gear wheel,
a shaft being substantially in parallel to said ecliptic axis,
a first disc and a second disc seated for rotations about said shaft,
a first pinion rigidly connecting said first disc and said second disc,
said fourth gear wheel being seated for rotations about said shaft, meshing with said third gear wheel and being connected to said first disc,
a first planet projector being mounted on said second disc,
a fifth gear wheel being rigidly mounted on said shaft between said first and said second disc,



a second driven axle being seated in said second disc substantially in parallel to the ecliptic axis and passing said second disc,
a sixth gear wheel being secured to one end portion of said second driven axle and meshing with said fifth gear wheel,
a seventh gear wheel being secured to the other end portion of said second driven axle,
an eighth gear wheel being seated for rotations on and about said shaft and meshing with said seventh gear wheel,
a third and a fourth disc being seated for rotations on and about said shaft,
said third disc being rigidly connected to said eighth gear wheel,
a second pinion rigidly connecting the third and the fourth disc,
and a second planet projector being mounted on said fourth disc.

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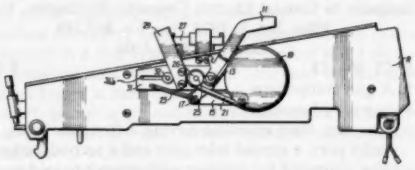
**4,166,402**

## INDEXING ROTARY ACTUATOR WITH ENERGY STORAGE AND LINKAGE LOCKING MEANS

**Wilson P. Rayfield, Pittsford, N.Y., assignor to Burroughs Corporation, Detroit, Mich.**

**Filed Oct. 21, 1977, Ser. No. 844,480**
**Int. Cl.[2] B23Q *17/00***
**U.S. Cl. 74—822** **8 Claims**



1. An indexing rotary actuator for unlocking a rotatable member, rotating the rotatable member to an index position and locking said rotatable member in said index position, said indexing rotary actuator comprising:
an actuatable pivot arm;
unlocking means responsive to the actuation of said pivot arm for unlocking said rotatable member;
means for rotating said rotatable member to an index position;
locking means responsive to the release of said pivot arm for locking said rotatable member in said index position;
at least one locking arm, cooperating with said locking means and said unlocking means, for locking and unlocking said rotatable member in an index position;
a guide block;
a locking arm receiving aperture in said guide block;
an upper guide surface on said guide block for guiding a locking arm into said aperture;
a lower guiding surface on said guide block for guiding a locking arm away from said aperture; and
a channel through said guide block communicating with said aperture adapted to receive an unlatching pin.

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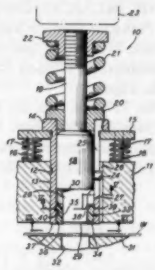
**4,166,403**

## METHOD OF MAKING A RIGIDLY SUPPORTED MOLDED PLASTICS MATERIAL PUNCH GUIDE AND STRIPPER

**Joseph S. DiDonato, Jr., Akron, and Timothy J. Kwiecinski, Lakewood, both of N.Y., assignors to Houdaille Industries, Inc., Buffalo, N.Y.**

**Filed Aug. 10, 1977, Ser. No. 823,404**
**Int. Cl.[2] B29D *23/08*; B26F *1/14***
**U.S. Cl. 83—13** **5 Claims**



1. The method of making a punch stripper assembly which comprises forming a molding cavity around the elongated transversely reduced active end of a punch and a rigid punch guide having an end edge with the active end of the punch extending at least to the end edge, pouring a hard setting flowable plastics material into said cavity to a height at least flush with the end edge of the guide but less than the length of said active end of the punch, curing said plastics material into a non-deformable solid stripper body in said cavity fixed to said punch guide whereby the body forms a lateral guide for the punch of the assembly during punching operation of the assembly, and retracting the punch in the guide to release said punch from said body while retaining said body fixed to said guide.

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**4,166,404**

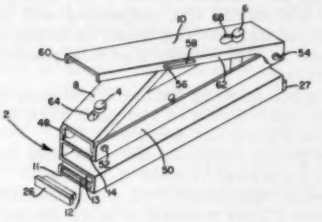
## HAND PUNCH

**Ehud Almog, 6 Golay-Kenia St., Tel Aviv, Israel**

**Filed Jan. 6, 1978, Ser. No. 867,237**
**Claims priority, application Israel, Nov. 25, 1977, 53464**
**Int. Cl.[2] B26F *1/02***
**U.S. Cl. 83—167** **9 Claims**

1. A hand punch comprising: a base having a substantially longer length than width, said base being formed with a plurality of punch pin openings arranged in a straight line along the

length of the base, and with a slot overlying said openings for receiving a sheet to be punched, a plurality of punch pins each normally overlying said slot and one of said openings and movable therethrough upon the manual depression of the punch; a manual operator for depressing said punch pins through said openings, said manual operator including a first lever arm pivotably mounted to one end of said base along a first pivotable axis parallel to the width of the base, and a



second lever arm pivotably mounted to the opposite end of said base along a second pivotal axis parallel to said first pivotal axis; said second lever arm overlying, and being longer than, said first lever arm and having an intermediate portion coupled by a slidable connection to the end of said first lever arm opposite to the pivotably mounted end of the first lever arm; and spring return means returning the two lever arms and the plurality of punch pins upon release of said manual operator.

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**4,166,405**

## ELECTRONIC MUSICAL INSTRUMENT

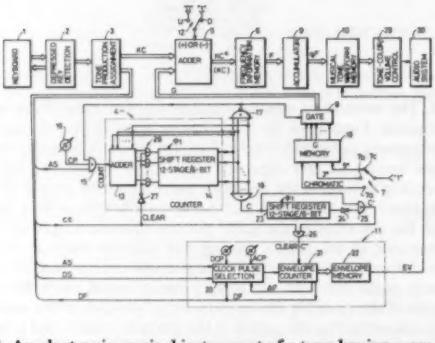
**Teruo Hiyoshi; Akira Nakada; Shigeru Yamada, all of Hamamatsu; Kiyoshi Ichikawa, Hamakita, and Sigeki Isii, Hamamatsu, all of Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan**

**Continuation of Ser. No. 727,789, Sep. 29, 1976, abandoned. This application May 26, 1978, Ser. No. 909,838**

**Claims priority, application Japan, Sep. 29, 1975, 50-117430**

**Int. Cl.[2] G10H *1/02***

**U.S. Cl. 84—1.24** **9 Claims**



1. An electronic musical instrument of a type having a grace tone effect, comprising:

keys,

means for generating, in response to depression of a selected one of said keys, a key code signal containing information designating a musical note corresponding to the selected key,

a frequency information memory containing a set of frequency information numbers that are proportional to the frequencies of musical tones,

access means, receiving a key code signal from said means for generating, for reading out from said frequency information memory a frequency information number corresponding to the received key code signal,

means for producing a musical tone for a depressed key on the basis of the frequency information number read from said frequency information memory and corresponding to the key code signal for a selected key, and

means, actuated at a transition between the depressed and released condition of said selected key, for changing said key code signal for a predetermined period of time and by a preselected fixed amount independent of the fundamental frequency of the produced tone, the resultant changed key code signal being provided to said access means instead of the unchanged key code signal, said instrument thereby producing a grace tone.

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**4,166,406**

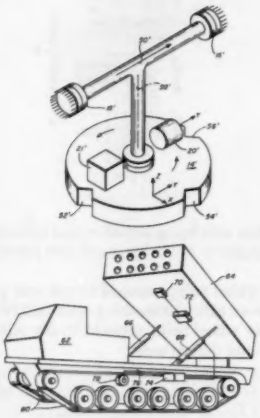
## SELF-ALIGNING PITCH AND AZIMUTH REFERENCE UNIT

**Robert W. Maughmer, Calabasas Park, Calif., assignor to Litton Systems, Inc., Beverly Hills, Calif.**

**Filed Sep. 6, 1977, Ser. No. 830,467**

**Int. Cl.[2] F41G *3/22***

**U.S. Cl. 89—1.815** **12 Claims**



1. A system for determining orientation or position comprising:

movable means having a principal direction of interest;

an instrument assembly including an accelerometer having its sensitive axis aligned with said principal direction and a two-degree-of-freedom gyro having its spin axis fixedly aligned with the sensitive axis of said accelerometer; and

support means for pendulously mounting said instrument assembly to said movable means for pendulous rotation only about an axis aligned with said principal direction of interest.

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**4,166,407**

## DRIVE MECHANISM FOR A GATLING GUN

**Eugene Ashley, and Thomas W. Cozzy, both of Burlington, Vt., assignors to General Electric Company, Burlington, Vt.**

**Filed Jan. 5, 1978, Ser. No. 867,248**

**Int. Cl.[2] F41D *7/04***

**U.S. Cl. 89—12** **8 Claims**

1. A gun comprising:

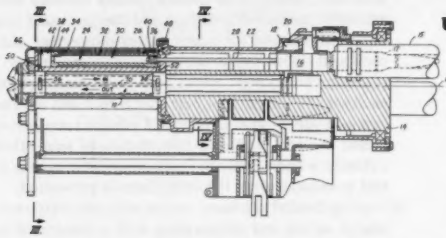
a stationary housing;

a stationary fluid manifold having a first inlet port, a first outlet port, a second inlet port and a second outlet port;

a rotor journaled for rotation with respect to said manifold, and having:

a plurality of gun barrels,

a like plurality of gun bolts,
a like plurality of cylinders, each having a double-acting piston therein,
each of said pistons coupled to a respective one of said bolts for reciprocating said bolt through a ram stroke and an extract stroke with respect to a respective one of said barrels,
each of said cylinders having:
a respective first port for cooperation with said first inlet port and said first outlet port of said manifold, and



a second port for cooperation with said second inlet port and said second outlet port of said manifold,
whereby in response to the rotational orientation of said rotor with resepct to said manifold, each of said cylinders in sequence,
during one time interval has its first port coupled to said manifold first inlet port and its second port coupled to said manifold second outlet port, and
during another time interval has its first port coupled to said manifold first outlet port and its second port coupled to said manifold second inlet port.

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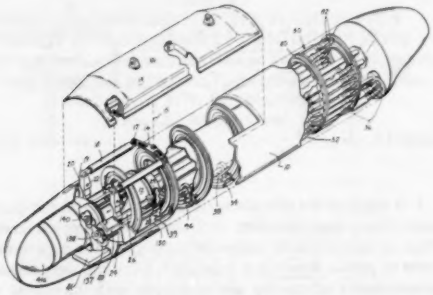
**4,166,408**
**AMMUNITION HANDLING SYSTEM**
**Lewis K. Wetzel, S. Burlington, and Edward A. Proulx, Burlington, both of Vt., assignors to General Electric Company, Burlington, Vt.**
**Filed Sep. 14, 1977, Ser. No. 833,324**
**Int. Cl.[2] F41D** *9/06*
**U.S. Cl. 89—33 D** **18 Claims**



1. An article handling system comprising:
an endless conveyor, including a plurality of article carriers disposed in a two layer, multiturn, helical spiral about a longitudinal axis, with a turnaround and transition between layers at each end; and
a pair of spaced apart multiturn helical spiral guides, supporting each of said article carriers therebetween; wherein:
each of said article carriers includes
an elongated article receiving member having a longitudinal axis,
a pair of spaced apart support members, one adjacent each end of said elongated member, engaging a respective one of said guides,
the longitudinal axis of each elongated member being parallel to said longitudinal axis of said conveyor.

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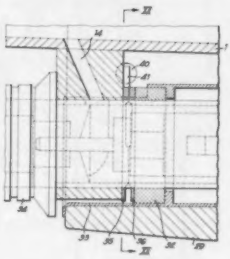
**4,166,409**
**SPORTING WEAPON**
**Georges A. Gevers, Liege, Belgium, assignor to Fabrique Nationale Herstal en abrege FN, Herstal, Belgium**
**Filed Sep. 19, 1977, Ser. No. 834,667**
**Claims priority, application Belgium, Sep. 6, 1977, 56216**
**Int. Cl.[2] F41D** *1/06, 5/12*
**U.S. Cl. 89—128** **4 Claims**



1. Automatic or semi-automatic sporting weapon of the gas operated type, comprising a casing, a magazine tube, a floating barrel with a barrel ring slidably embracing said magazine tube and a foregrip embracing said foregrip and barrel ring, the assembly being maintained by means of a sealing plug screwed into said magazine tube and bearing against one end of the foregrip, the other end of the latter bearing against said casing and whereby, in position of rest, a free annular space is provided between the rear end of the barrel, the breech and the corresponding part of the casing characterized by the fact that aforesaid free annular space is obtained by a washer which bears against said barrel ring and via an elastic stop, against a reinforcing and support tube fixed to the foregrip, whereby the width of said free annular space can be modified by adjusting said washer to lock or unlock said floating barrel.

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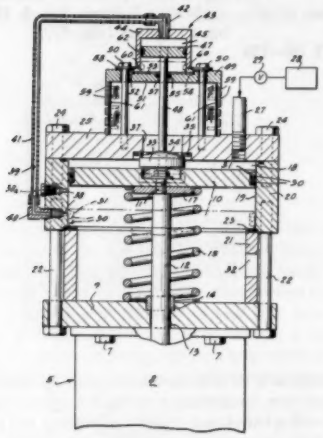
**4,166,410**
**PNEUMATIC MOTOR**
**Paul W. Schlosser, Houston, Tex., assignor to Edward Bleiweiss, Houston, Tex.**
**Filed Sep. 26, 1977, Ser. No. 836,586**
**Int. Cl.[2] F01L** *25/04, 23/00*
**U.S. Cl. 91—50** **7 Claims**

1. In combination in a self-cycling pneumatic motor:
a reciprocable piston having a head at one end and a piston rod extending from its opposite end and adapted to be connected to a member to be driven by the piston;
a hollow cylinder providing a working chamber in which the piston is reciprocable in working and return strokes;
a closure at one end of the working chamber, and the opposite end of the working chamber being open to atmosphere;
said piston head facing toward said closure;
means normally biasing the piston in return stroke direction toward said closure;
means for delivering piston driving air under pressure into said working chamber between said closure and the piston head to drive the piston in a power stroke in opposition to said biasing means;
said closure having an exhaust port with a valve seat at the working chamber end of the port;
a valve member normally biased in closing relation against said seat by air pressure in the working chamber;

means activated by air pressure from within the working chamber after the piston has substantially reached the end of the power stroke for unseating said valve member for exhausting air pressure from the working chamber to release the piston for biased return stroke;

said valve member being returned to said seat by the piston at substantially the end of the return stroke so that air pressure delivered by said delivering means into the working chamber can drive the piston in another power stroke;

a mounting plate;



means for mounting said cylinder on the mounting plate comprising a ring having an end facing toward said piston, said ring having an opening to atmosphere;

said mounting plate having a bore therethrough for passage of the piston rod;

and a guide bearing bushing mounted in said passage in said mounting plate for accurately guiding the piston rod in said bore; and said end of said ring serving as a power stroke stop for said piston.

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**4,166,411**

**FLUID-OPERATED LINEAR ACTUATOR**

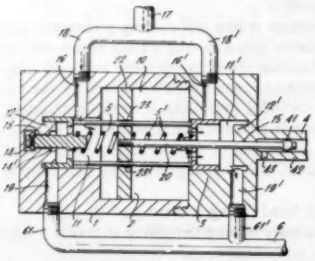
**Dan Bron, 36, Hapalmach St., Romema, Haifa, Israel**

**Filed Mar. 29, 1977, Ser. No. 782,351**

**Claims priority, application Israel, Apr. 1, 1976, 49332**

**Int. Cl.[2] F01L *31/08, 23/00***

**U.S. Cl. 91—337** **6 Claims**



1. A linear fluid-operated actuator comprising:

(a) a casing having a main cylinder and two axially spaced apart valve cylinders provided on opposite sides of said main cylinder in coaxial relation and in fluid communication therewith, each said valve cylinder including inlet and outlet means;

(b) piston assembly means comprising a piston head and an elongated piston rod slidingly movable in said main cylinder and provided with force transmitting means adapted to transmit the motion of said piston assembly means to the outside;

(c) a linear flow control assembly comprising two sleeve valves mounted in said casing concentrically with the longitudinal axis of said piston rod, each said sleeve valve having a transverse base wall and at least one aperture therethrough, each said sleeve valve being slidable within one of said valve cylinders, said sleeve valves being coaxially spaced from and rigidly connected to each other by at least two parallel rods loosely passing through said piston assembly means internally of said casing at said respective bore wall thereof for simultaneous movement, the size of each said sleeve valve, the extent of its movement and the position of said inlet means and outlet means provided in each said valve cylinder being such that said inlet means in one said valve cylinder is closed while its respective outlet means is open, and said inlet means of said other valve cylinder is open while its respective outlet means is closed and communication between them is prevented;

(d) spring-loaded retaining means adjacent only one of said sleeve valves and cooperating with a portion of said casing for temporarily preventing movement of said valve assembly from both of its end positions;

(e) spring means between said piston and each said sleeve valve; and

(f) abutment means positioned between said piston head and said base wall of said sleeve valves, said abutment means being adapted to cause movement of said sleeve valves before said piston head has reached the end of its stroke.

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**4,166,412**

**APPARATUS FOR MANUFACTURING PLASTIC BAGS WITH CONNECTION NIPPLES**

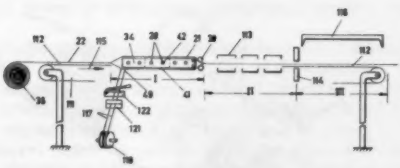
**Arnoldus J. Versteege, Blvd. Paulus Loot 77, Zandvoort, Netherlands**

**Filed Jun. 24, 1976, Ser. No. 699,447**

**Claims priority, application Netherlands, Jul. 14, 1975, 7508410**

**Int. Cl.[2] B31B *1/84***

**U.S. Cl. 93—8 VB** **34 Claims**



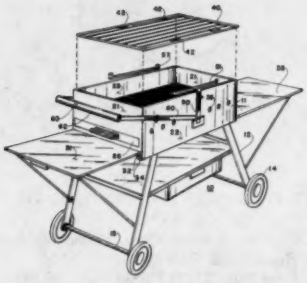
1. A machine for manufacturing continuous and non-pyrogenous plastic bags provided with connection nipples, said machine comprising coil means for supplying two superimposed webs of plastic material, a conveyor, a driving mechanism for intermittently advancing said conveyor with the plastic webs and a welding-cutting unit, provided with a sliding block, said sliding block having the shape of a rectangular parallepiped, wherein one of the two long side faces of said parallelopiped serving as a supporting face and a counter electrode for welding on one or more connecting nipples in cooperation with an outer die opposite said one said face and wherein, for simultaneous welding of a plurality of separately manufactured connection nipples, said side face of said sliding block serves as a supporting face and a counter electrode, there being further included a plurality of swinging devices positioned in opposition to said side face, said swinging devices being mounted on slides and piston means for driving said slides.

4,166,413

## BARBECUE

Albert Meszaros, 81 Sleepy Hallow Rd., North Tarrytown, N.Y. 10591

Filed Jun. 8, 1977, Ser. No. 804,630
Int. Cl.[2] A47J 37/08
U.S. Cl. 99—393 1 Claim



1. A barbecue unit in the form of a housing mounted on support legs,

said housing shaped as a rectangular box, open to the top, fitted with

a grill detachably resting on pair of support members above the open top of the housing, with each support member externally slidably and pivotally mounted to an opposed side of the housing, and

a pair of lever means, each pivotally and slidably mounted to an opposite side of the housing and each pivotally mounted to an individual support member, with both said lever means externally joined together by a handle, such that manual manipulation of said handle serves to pivot said lever means so as to elevate or lower the grill resting on the support members, and to also pivot said grill in a plane at a desired angle to the plane of the open top of the housing, together with fastener means to alternatively restrain or to free each support member with regard to motion of the support member with respect to the side of the housing to which it is slidably mounted.

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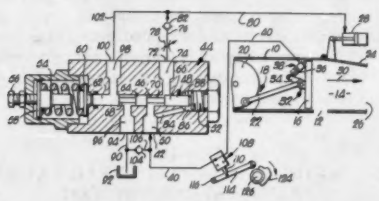
4,166,414

## CROP-LOADING-RESPONSIVE FLUID SUPPLY CIRCUIT IN BALE DENSITY CONTROL SYSTEM

Garold L. Fleming, Hesston, and George Yatcilla, Newton, both of Kans., assignors to Hesston Corporation, Hesston, Kans.

Filed Sep. 7, 1978, Ser. No. 940,439
Int. Cl.[2] B30B 15/30
U.S. Cl. 100—43 5 Claims



1. In a baler of the type wherein a reciprocating plunger progressively forms a bale by incrementally forcing the same through the restricted orifice of a baling chamber as a loader successively inserts new charges of material between the retracted plunger and the bale in timed relationship to reciprocation of the plunger, said orifice being at least partially defined by structure that is shiftable laterally with respect to the path of bale travel through said chamber for the purpose of enlarging or restricting said orifice, said structure having a fluid-pressure device coupled therewith for applying a holding force against movement of the structure in a direction to enlarge the orifice, said loader having control means associated therewith for temporarily deactivating the loader without interrupting reciprocation of the plunger, the improvement comprising:

a fluid-pressure circuit connected with said device for pressurizing the same to effect said holding force,

said circuit including a fluid pump and a check valve between said pump and said device operable when closed to prevent fluid flow into said device from the pump for further pressurization of the device,

said pump being operable during each compaction stroke of the plunger, if the pressure in said circuit on the pump side of said check valve exceeds the pressure in said circuit on the device side of said valve whereby to open said check valve, to add a slug of fluid to said device for further pressurization thereof,

said circuit being responsive to pressure therein beyond a certain predetermined level to depressurize said device by an amount which reduces said holding force,

said circuit further including a control valve on the pump side of said check valve operable when closed to preclude said addition of a slug of oil to the device by the pump and operable when open to permit said slug addition; and

valve operating means responsive to operation of said loader for closing said control valve upon said deactivation of the loader.

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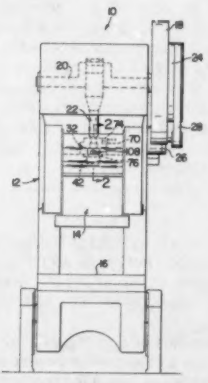
4,166,415

## PRESS HAVING OVERLOAD RESPONSIVE SLIDE SHUT HEIGHT ADJUSTING MECHANISM

Edwin A. Spanke, Oak Forest, and Louis F. Carrieri, La Grange Park, both of Ill., assignors to Gulf & Western Manufacturing Company, Southfield, Mich.

Filed Apr. 21, 1978, Ser. No. 898,833
Int. Cl.[2] B30B 1/26, 15/28
U.S. Cl. 100—53 19 Claims



1. A press comprising frame means including a bed, a slide supported by said frame means for reciprocating movement toward and away from said bed, drive means for reciprocating said slide and including connecting rod means, and overload responsive slide shut height adjusting means interconnecting said slide and connecting rod means, said adjusting means including cylinder means on one of said slide and connecting rod means, piston means, means axially adjustably mounting said piston means on the other of said slide and connecting rod means, said piston means being axially reciprocably received in said cylinder means, means to limit movement of said piston means in one direction relative to said cylinder means, and hydraulic circuit means including means to deliver hydraulic fluid under pressure between said piston means and cylinder

means to move said piston means in said one direction and means to release fluid under pressure from between said piston means and cylinder means in response to an overload on said slide for said piston means to move relative to said cylinder means in the direction opposite said one direction.

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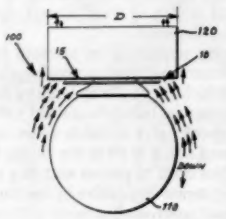
**4,166,416**

## OBTURATING SPLIT DISC

**Leland F. Leavitt, Ogden, Utah, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Apr. 28, 1978, Ser. No. 900,949**
**Int. Cl.[2] F42B *25/20***
**U.S. Cl. 102—2** **4 Claims**




1. In an air-dropped bomb of the anti-personnel type having a forward body section, and an aft fin section with a diameter, wherein said bomb is air-dropped, it spins and is thereby armed internally, and wherein completion of said arming depends upon the rate of spin of the bomb, the improvement comprising:

a. a disc of resilient plastic material having a centrally located aperture therein, and also having a preselected diameter that is smaller than said diameter of said aft fin section;

b. and, means for releasably connecting said disc to said bomb prior to the air-drop of said bomb;

wherein said disc is interposed between said forward body section and said aft fin section, and is releasably connected by said means to said bomb threat;

whereby said disc obturates some air flow through said aft fin section, and said rate of spin of said air-dropped bomb is decreased; and thereby, the completion of said arming is delayed.

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**4,166,417**

## EXPLOSIVE BOOSTING DEVICE FOR LOW-SENSITIVITY BLASTING AGENTS

**Sidney H. Woodcock, 16233 NE. 12 Pl., Bellevue, Wash. 98008, and Michel E. Maes, 14508 SE. 51st St., Bellevue, Wash. 98006**

**Continuation-in-part of Ser. No. 745,792, Nov. 29, 1976, abandoned, which is a continuation-in-part of Ser. No. 713,783, Aug. 12, 1976, abandoned, which is a continuation-in-part of Ser. No. 516,729, Oct. 21, 1974, abandoned. This application Dec. 27, 1977, Ser. No. 864,663**
**Int. Cl.[2] F42D *1/04***
**U.S. Cl. 102—23** **14 Claims**

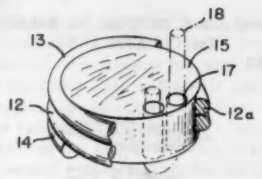
1. A method of initiating a low sensitivity blasting agent, comprising:

spirally wrapping a length of detonating coil a plurality of turns about an inert center zone to form a coil with multiple wraps surrounding said center zone;

positioning a remotely ignitable detonating means closely adjacent said coil;

embedding said detonating cord and detonating means in said low sensitivity blasting agent; and

triggering said detonating means thereby initiating said detonating cord such that a pair of detonation fronts propagate away from each other and meet detonation fronts propagating toward said detonation front to produce a shock




reinforcing effect for initiating said low sensitivity blasting agent.

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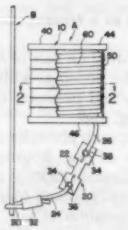
**4,166,418**

## TIME DELAY PRIMER AND METHOD OF MAKING SAME

**Brooke J. Calder, Jr., Aurora, Ohio, assignor to Austin Powder Company, Beachwood, Ohio**

**Filed May 23, 1977, Ser. No. 799,548**
**Int. Cl.[2] F42B *3/10***
**U.S. Cl. 102—24 R** **2 Claims**




1. In a delay primer unit for detonating an explosive material in a borehole with a detonating cord down line extending into said borehole, said primer unit comprising: an explosive element capable of detonating said explosive material upon being detonated; means for preventing direct detonation of said explosive element by said down line; a time delay detonating element extending between said down line and said explosive element with a known detonation time delay value between first and second ends of said delay element; first means slidably associating said first end with said down line; and, second means for connecting said second end in detonation relationship with said explosive element, the improvement comprising: said explosive element including a generally cylindrical support element and a detonating cord wrapped in several convolutions around said support element to form a primer; and, said second means being a length of detonating cord extending from said second end to said wrapped detonating cord, said support element being a spool having an inner cylindrical wall around which said primer forming detonating cord is wrapped, said wall forming said preventing means.

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**4,166,419**

## PNEUMATICALLY PROPELLED RAILWAY CAR TRANSPORTATION SYSTEM

**Stefan Ardeleanu, Bucharest, Romania, assignor to Institutul National Pentru Creatie Stiintifica si tehnica-"INCREST", Bucharest, Romania**

**Filed Jun. 30, 1977, Ser. No. 811,677**
**Claims priority, application Romania, Jul. 20, 1976, 87025**
**Int. Cl.[2] B61B *3/00, 13/10, 15/00*; B61F *13/00***
**U.S. Cl. 104—138 R** **4 Claims**

1. A pneumatic transport system comprising:

a tube;

an overhead rail in the form of an I-beam mounted within said tube; and

a vehicle riding along said rail, said vehicle comprising:

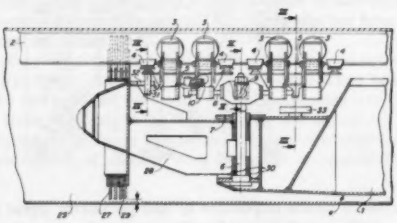
an elongated container suspended beneath said rail and displaceable therealong within said tube,

at least one vertical pivot mounted at an end of said container,

a horizontal pivot mounted on said vertical pivot for rotation therewith in a horizontal plane,

a pair of oppositely extending arms mounted on said horizontal pivot and rotatable thereabout in a vertical plane and rotatable therewith in a horizontal plane,

respective journal means provided at a free end of each of said arms, said journal means each including a first spherical surface affixed to the respective arm and a second



spherical surface complimentary to the first and riding thereon,

a support mounted on each of said second surfaces,

a plurality of support rollers mounted on each of said supports and engaging a lower flange of said rail,

a plurality of first guide rollers vertically mounted on each of said supports and flanking the lower flange of said rail,

packing means mounted on said vertical pivot of said container forming a pneumatic barrier with said tube to enable said vehicle to be pneumatically displaced through said tube, and

a plurality of second guide rollers mounted on said container and normally spaced from the wall of said tube for engagement therewith only during lateral displacement of said container.

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**4,166,420**

## RAILWAY BOGIE EMERGENCY RUN GUIDE ASSEMBLY

**Johannes Pleger, Pocking uber Starnberg, and Manfred Preuss, Netphen, both of Fed. Rep. of Germany, assignors to Waggon Union GmbH, Fed. Rep. of Germany**

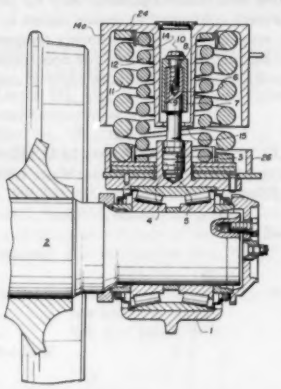
**Filed Sep. 12, 1977, Ser. No. 832,604**

**Claims priority, application Fed. Rep. of Germany, Sep. 17, 1976, 2641809**

**Int. Cl.**[2] **B61F** *3/08, 5/06, 5/32, 5/38*

**U.S. Cl. 105—224 R** **5 Claims**

1. An emergency run guide assembly for the axles of a bogie frame for rail cars which have axle boxes and which also have spring leaf guide rods for the axle guidance which are secured at their one ends on the bogie frame and at their opposite ends to the axle boxes, and which spring leaf guide rods are subject to breakage, comprising, a secondary guide including a bushing secured vertically on the bogie frame and having a cylindrical bushing wall, an axle box housing on the axle of the bogies, a bolt mounted on the axle box housing and secured in a substantially vertical position, a cylindrical sleeve member having an open bottom end and an opposite top closed end with a bore through the top closed end and being mounted on said bolt with its open bottom end extending downwardly and having walls spaced radially outwardly of said bolt and spaced



inwardly of said cylindrical bushing wall, and a screw engaged into the bore of the sleeve member and threaded into said bolt.

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**4,166,421**

## CYCLONIC FURNACE

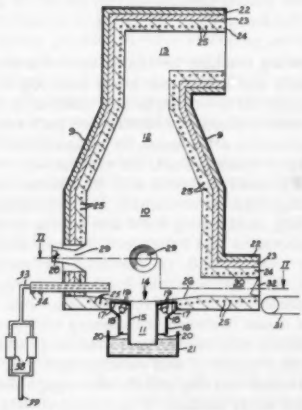
**John B. Stribling, Worcester, England, assignor to Heenan Environmental Systems Ltd., Worcester, England**

**Filed Aug. 11, 1977, Ser. No. 823,693**

**Claims priority, application United Kingdom, Aug. 20, 1976, 34776/76**

**Int. Cl.**[2] **F23G** *5/12*

**U.S. Cl. 110—187** **17 Claims**



1. A furnace comprising an operatively fixed circular generally level hearth; a combustion chamber extending above the hearth and leading to an outlet flue; at least one feed inlet for admitting solid or liquid waste or other material to be burnt into the combustion chamber and onto said hearth, said material feed inlet being provided with means resisting inflow of air therethrough; an outlet opening through the hearth for discharge of ash and slag also provided with means resisting inflow of air therethrough; whereby no significant amount of air is permitted to enter through said material feed inlet or said outlet opening; at least one combustion air port opening tangentially through the chamber periphery substantially above the levels of the hearth and said feed inlet and downwardly directed toward the hearth for the controlled admission of combustion air in a path which will create a vortex flow within

the combustion chamber above the material burning on the hearth in use; a furnace preheater positioned in the chamber periphery above said hearth operated only for preheating the furnace; and means connected to sensor means in the combustion chamber responsive to the operating temperature of the furnace when burning said material for controlling admission of fuel feed to said preheater and admission of combustion air.

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**4,166,422**

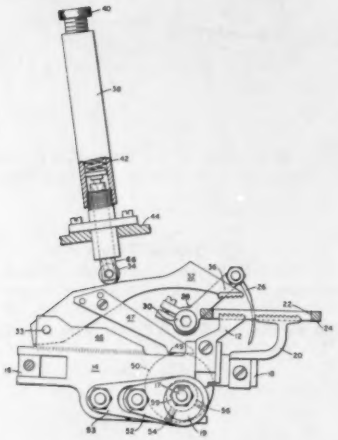
**TOP FEED FOR SEWING MACHINE**

**Robert E. Porter, 5 Oak St., Hamilton, Mass. 01982**

**Filed Sep. 6, 1978, Ser. No. 939,967**

**Int. Cl.[2] D05B *27/06***

**U.S. Cl. 112—311** **5 Claims**



1. In a sewing machine having at least one reciprocating stitching needle and at least one lower feed dog for engaging and disengaging the lower surface of material to be sewn to move said material along a predetermined path relative to the stroke of said needle, drive means for actuating said lower feed dog including a rotating shaft, the combination of an upper feed dog arm pivotally linked to said drive means to cause said upper feed dog to move substantially in synchronism with said lower feed dog, an actuating lever arm having an end thereof fixedly connected to said upper feed dog arm and extending toward said rotating shaft, an eccentric cam mounted upon said rotating shaft, said actuating lever arm having a cam-following surface formed thereon and in contact with said eccentric cam and means resiliently maintaining said cam-following surface in contact with said cam, the contour of said cam being such that with rotation of said rotating shaft said upper feed dog and said lower feed dog periodically engage and disengage the upper and lower surfaces of said material respectively in synchronism with reciprocating movement of said stitching needle to feed said material along said predetermined path relative to the stroke of said stitching needle.

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**4,166,423**

**ADAPTIVE SEWING MACHINE**

**Michael J. Brienza, Westport, Conn.; Stephen A. Garron, Elizabeth, and Robert Sedlatschek, Bridgewater, both of N.J., assignors to The Singer Company, New York, N.Y.**

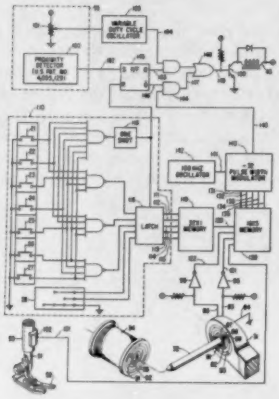
**Filed Feb. 28, 1978, Ser. No. 881,995**

**Int. Cl.[2] D05B *47/04***

**U.S. Cl. 112—254** **7 Claims**

4. In a sewing machine having a support for work fabric to be stitched, stitch forming instrumentalities including a thread carrying needle adapted for endwise reciprocation to penetrate the fabric, a supply of thread for said needle, and a thread handling system for the thread disposed intermediate said supply and said needle, the improvement comprising:

signaling means for providing a parameter signal indicative of a parameter which affects stitch quality including means for sensing the thickness of the fabric; and



control means responsive to said parameter signal for controlling said thread handling system to maintain uniform stitch quality.

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**4,166,424**

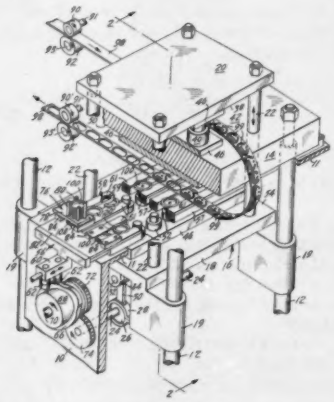
**PRESS APPARATUS AND METHOD UTILIZING SAME**

**Kurt L. Hahn, San Rafael, and Robert J. Allen, Daly City, both of Calif., assignors to American Can Company, Greenwich, Conn.**

**Division of Ser. No. 662,905, Mar. 1, 1976, Pat. No. 4,026,226, and a continuation of Ser. No. 764,213, Jan. 31, 1977, abandoned. This application Mar. 3, 1978, Ser. No. 883,174**

**Int. Cl.[2] B21D *43/16***

**U.S. Cl. 113—114 BE** **2 Claims**



1. A can end blank feeding mechanism, comprising:

stacking means for holding a plurality of can ends in a vertical stack of blanks;

a transfer bar having a plurality of linearly-aligned openings formed thereon each dimensioned and configured to seat therein, and to provide underlying support for, one of the blanks, said transfer bar having at least one slot extending along the axis of alignment of said openings and providing interconnection between adjacent openings thereof, said slot being dimensioned and configured to permit tooling

to pass therethrough, and a platform portion adjacent to a first said opening, said transfer bar being mounted for reciprocation in a horizontal plane beneath said stacking means from a first position wherein said first opening is aligned with and beneath said stack to a second position of said transfer bar wherein said platform portion is aligned with and beneath said stack;

a pair of blades mounted upon said transfer bar along opposite sides of said first opening, said blades positioned and adapted to pass between the lower most and the adjacent blanks in said stack, to separate the lowermost blank and permit it, upon alignment over said first opening, to drop thereinto while the remainder of the stack is supported upon the upper surfaces of said blades, movement of said transfer bar to its second position enabling a stack of blanks in said stacking means to be supported on said platform portion, with the lowermost and adjacent blanks of the stack being disposed to permit entry of said blades therebetween upon movement of said transfer bar from its second to its first position;

and a plurality of means dimensioned and positioned to clear between sides of said slot, having an upward lifting action to lift and hold said blanks during the reciprocation of said bar from its second to its first position, and having a lowering action to lower said blanks into said openings prior to movement of said bar from its first to its seco sition.

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**4,166,425**

## ELASTIC CONNECTION ASSEMBLY FOR THE MAST OF A SAILBOAT

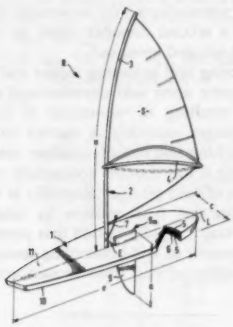
**Hans E. Kummetz, Otto-Raggenbass Strasse 4, D-775 Konstanz/Bodensee, Fed. Rep. of Germany**

**Filed Aug. 5, 1977, Ser. No. 822,056**

**Claims priority, application Fed. Rep. of Germany, Aug. 13, 1976, 2636457; Oct. 27, 1976, 2648784**

**Int. Cl.[2] B63B *15/02***

**U.S. Cl. 114—39** **26 Claims**



1. A sailboard for wind surfing comprising a board, a mast, heel joint means detachably supporting said mast on said board for freely rotatable and pivotable movement with respect thereto, and a sail stretched on said mast, said heel joint means comprising two opposed bushings one coupled to said mast and the other to said board, said bushings having opposed edges abutting against one another, and a block of material of high elasticity engaged in said bushings and coupled thereto to permit elastic pivotal movement of said mast by rocking of the bushings on one another, said block of material being resistant to water and heat, said heel joint means further comprising a plug-in pin removably engageable in a recess provided in said board and means interposed between said other of the bushings and said pin to provide rotation of said other bushing with respect to said recess, said recess having a depth greater than the length of the plug-in pin, the heel joint means further comprising an end pin of limited deformability adjoining and coupled to said plug-in pin at the end thereof inserted in said recess.

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**4,166,426**

## METHOD OF CONSTRUCTION OF TWIN HULL VARIABLE DRAFT VESSEL

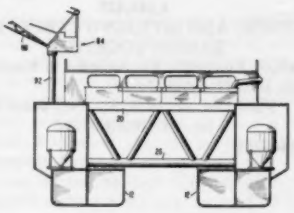
**Samuel H. Lloyd, III, Mill Valley, Calif., assignor to Santa Fe International Corporation, Orange, Calif.**

**Division of Ser. No. 708,133, Jul. 23, 1976, Pat. No. 4,091,760, said Ser. No. 708,133, is a continuation of Ser. No. 529,061, Dec. 3, 1974, abandoned, which is a continuation of Ser. No. 177,219, Sep. 2, 1971, abandoned, said Ser. No. 177,219, is a division of Ser. No. 766,662, Sep. 4, 1968, Pat. No. 3,616,773, said Ser. No. 766,662, is a continuation-in-part of Ser. No. 666,395, Sep. 8, 1967, abandoned. This application Oct. 15, 1976, Ser. No. 732,767**

**The portion of the term of this patent subsequent to Nov. 2, 1988, has been disclaimed.**

**Int. Cl.[2] B63B *9/00***

**U.S. Cl. 114—65 R** **58 Claims**



1. A method of constructing a column stabilized semisubmersible variable draft vessel comprising the steps of:

fabricating a pair of elongated hulls with each of said hulls having an oblong transverse cross section with a breadth greater than its height and having top and bottom substantially planar parallel surfaces extending substantially the entire length of each hull between bow and stern thereof; and disposing said hulls in substantially parallel spaced side-by-side relation with each of said hulls spaced from and lying on an opposite side of the longitudinal centerline of said vessel;

fabricating a working platform and also means for supporting said platform in fixed spaced relation above said hulls a predetermined height and normally lying in a generally horizontal plane, said means including at least three pairs of upstanding columns connecting with said hulls and said platform, each of said columns being made with a substantially constant cross sectional area over the effective height of the column between the platform and associated hull;

fabricating and disposing a plurality of longitudinally spaced structural truss means interconnecting and reinforcing the structural relationship of the hulls, platform and columns, with such truss means including substantially transversely extending members structurally interconnecting uppermost portions of the hulls;

forming said vessel with said hulls, columns and related components so that the vessel is generally rectangular in plan with the length of said vessel along its longitudinal centerline and roll axis being at least plural times as great as the width of said vessel along its transverse centerline and pitch axis; locating at least three of said columns on each of said two hulls on opposite sides of the vessel's roll axis with pairs of such columns being located near opposite ends of each of said hulls on opposite sides of the vessel's pitch axis and at least another pair of said columns being located at an intermediate position on each of said hulls; and providing such columns with configurations and cross-sectional areas throughout effective height thereof and locating said columns at distances from the vessel's longitudinal roll axis and transverse pitch axis

such that said columns will maintain the vessel's metacenter above the vessel's center of gravity for the high draft semisubmerged operating positions of the vessel and also such that said columns will provde righting moment about the longitudinal roll axis which is less than righting moment provided about said transverse pitch axis when the vessel is in semisubmerged column stabilized operating position;

providing said hulls with ballast compartments, and providing means for ballasting said vessel when required to alter its draft between a low draft hull-supported floating condition in which the hulls have freeboard with said transversely extending members structurally interconnecting uppermost portions of the hulls being disposed above the mean waterline and a high draft semisubmerged column stabilized floating and operating condition in which the mean waterline is located along intermediate portion of said columns above said hulls and below the underside of said platform.

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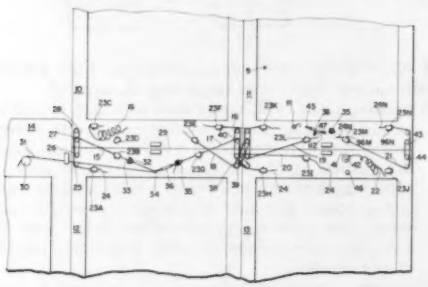
**4,166,427**

## TIGHTENING AND SECURING CABLES HOLDING BARGES TOGETHER

**Jack R. Bullard, Louisville, Ky., assignor to American Commercial Lines, Inc., Houston, Tex.**

**Filed Oct. 21, 1977, Ser. No. 844,478**
**Int. Cl.[2] B63B *21/56***
**U.S. Cl. 114—251** **14 Claims**



1. The method of drawing and binding two barges together by tightening a cable with at least one bitter end comprising the steps of securing one end of the cable to the deck of a barge, wrapping the cable around fittings on said two barges to bind them together, attaching a portable clamp to the unsecured bitter end of the cable, securing a movable jack temporarily to a fixed object on the deck of a barge and the clamp, tightening the cable by means of said jack to draw and bind the two barges together, clamping the tightened cable in place on a barge deck and removing the portable clamp and jack from the cable and deck for use elsewhere.

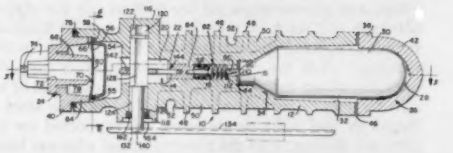
5. Cable clamp apparatus comprising a set of movable cable clamping jaws substantially rectilinear in form and pivoted to reciprocally move in a generally axial direction of a cable passed therethrough thereby to open and close on a cable of predetermined size in opposed axial movement directions, a framework comprising two spaced apart support members holding said jaws and pivot pins about which said jaws are pivoted with the pivot pins removably in place, a pivot mechanism movable with said jaws about said pivot pins comprising forward and rearward lever sets with levers on opposite sides of the jaws, accessible extensions from one lever set extending outside said framework to selectively forceably move the pivoting mechanism in said axial movement directions, and a spacer between the two support members fully enclosing said pivot pins therebetween while permitting pivoting movement of the levers about the pivot pins between said support members.

**4,166,428**

## INTRUDER ALARM

**John D. Freeman, Westport; David E. Earls, Norwalk, both of Conn., and Edward F. Cielaszyk, Oglesby, Ill., assignors to General Time Corporation, Thomaston, Conn.**

**Filed May 9, 1978, Ser. No. 904,262**
**Int. Cl.[2] G08B *13/08***
**U.S. Cl. 116—86** **14 Claims**



1. An intruder alarm for providing a signal when actuated upon unauthorized entry into a secured area comprising:

(a) a housing having a flow passage, said housing adapted to be mounted on a first member,

(b) a signaling means mounted on said housing at one end of said flow passage, said signaling means being responsive to a flow of fluid through said flow passage for providing said signal,

(c) means for mounting a container enclosing a fluid under pressure isolated from the atmosphere by a closure member so that said closure member is juxtaposed to the other end of said flow passage, said mounting means received on said housing and having an internal wall surface substantially complementary to the outer wall surface of said container,

(d) a plunger assembly disposed in said flow passage and movable from a first position toward said closure member, said assembly including

(1) means for opening communication between said fluid and said flow passage so that said fluid is adapted to enter said flow passage,

(e) an actuating means adapted for movement in response to movement of a second member upon an unauthorized entry into said secured area, and

(f) means connecting said actuating means and said plunger assembly whereby upon said unauthorized entry to said secured area resulting in movement of said actuating means said plunger assembly is moved from said first position for opening said communication, said connecting means including a lost motion connection whereby said opening means of said plunger assembly is controlled in movement from said first position by said connecting means yet it retracts rapidly to said first position independently of movement of said connecting means to provide unobstructed entry of said fluid to said communicating flow passage.

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**4,166,429**

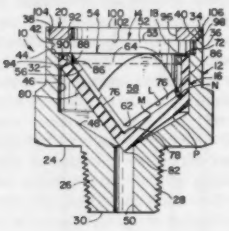
## FLUID PRESSURE INDICATOR

**Adam Smorzaniuk, West Millington, N.J., assignor to Amerace Corporation, New York, N.Y.**

**Filed Sep. 14, 1977, Ser. No. 833,369**
**Int. Cl.[2] G01L *23/06***
**U.S. Cl. 116—202** **7 Claims**

1. A fluid pressure indicator for providing visual indication of the magnitude of a fluid pressure condition, said indicator comprising a transparent, clear optical element including a front surface for receiving ambient light and a rear, light reflecting portion having three mutually perpendicular plane surfaces defining a cube corner having an apex remote from said front surface and a cube corner axis, a resilent, imperforate diaphragm in cooperative relationship with said rear, light reflecting portion to provide a chamber between the interior of said diaphragm and said plane surfaces, said diaphragm having three internal surfaces, each confronting but normally not in

optical engagement with a different one of said plane surfaces, but resiliently deformable into such optical engagement upon the application of a positive fluid pressure differential to the exterior of said diaphragm, and a body having means for attachment to a fluid line in fluid tight relationship therewith and an aperture in open communication with the exterior of said



diaphragm and adapted for open communication with said fluid line, the exterior of said diaphragm being in fluid sealed relationship with said body to prevent ingress of fluid from said aperture into said chamber, said diaphragm also having an edge surface, said indicator including an unsealed path past said edge surface of said diaphragm for fluid flow between said chamber and the atmosphere.

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**4,166,430**

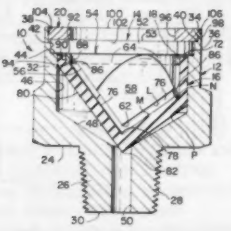
## FLUID PRESSURE INDICATOR

**Glenn W. Johnson, Jr., Summit, N.J., assignor to Amerace Corporation, New York, N.Y.**

**Filed Sep. 14, 1977, Ser. No. 833,370**

**Int. Cl.[2] G01L *23/06***

**U.S. Cl. 116—202** **13 Claims**



1. A fluid pressure indicator for providing visual indication of the magnitude of a fluid pressure condition, said indicator comprising a transparent, clear optical element including a first surface for receiving ambient light and a rear, light reflecting portion having three mutually perpendicular plane surfaces defining a cube corner having an apex remote from said front surface and a cube corner axis, and a resilient, imperforate diaphragm in cooperative relationship with said rear, light reflecting portion to provide a chamber between the interior of said diaphragm and said plane surfaces, said diaphragm having three internal surfaces, each confronting but normally not in optical engagement with a different one of said plane surfaces, but resiliently deformable into such optical engagement upon the application of a positive fluid pressure differential to the exterior of said diaphragm.

**4,166,431**

## RESERVOIRS FOR LIQUIDS

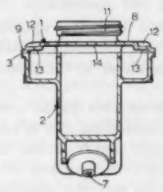
**John F. Pickering, Solihull, England, assignor to Girling Limited, Birmingham, England**

**Filed May 31, 1977, Ser. No. 801,902**

**Claims priority, application United Kingdom, Jun. 24, 1976, 26255/76**

**Int. Cl.[2] B65D *25/56*; G01F *23/02***

**U.S. Cl. 116—227** **5 Claims**



1. A reservoir for use as a container for hydraulic fluid in a vehicle hydraulic system, said container having a continuous side wall, a top wall extending over said side wall, said side wall extending downwardly from said top wall, a filler opening in said top wall through which fluid can be introduced into said container, at least one integral portion of said top wall being depressed to form a window, said one portion and at least a part of the surrounding area of said top wall being transparent or translucent, and the internal face of said window lying in a plane spaced below a plane containing the internal face of the said part of said surrounding area to define a predetermined level of fluid when fluid is introduced into said container through said filler opening, said predetermined level being indicated visually by surface contact of said fluid with said internal face of said window to cause an apparent colour change, which contrasts with said part of said surrounding area which at said predetermined level is untouched by said fluid.

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**4,166,432**

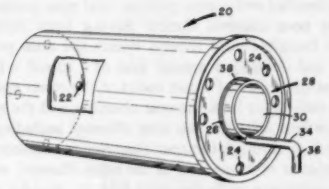
## METHOD FOR CONVERTING A DISPOSABLE STORAGE CONTAINER TO A BIRD NESTING BOX AND ARTICLES OF MANUFACTURE ASSOCIATED THEREWITH

**Michael R. P. Moore, 11724 Lovejoy, Silver Spring, Md. 20902**

**Filed Apr. 21, 1977, Ser. No. 789,347**

**Int. Cl.[2] A01K *31/00***

**U.S. Cl. 119—23** **8 Claims**



1. A method for converting a storage container to a bird nesting box, the storage container being of the type which typically holds a granular-type substance and which is sealably closed at one end by means of a snap-fit lid, the storage container having a scoop disposed therein, which scoop includes a handle member extending therefrom, the method comprising the steps of:

defining an enclosed geometrical shape in the planar surface of the lid;

weakening the material of which the lid is formed above the perimeter of the geometrical shape;

subsequently removing the material of the lid included

within the perimeter of the geometrical shape to form an access opening;

defining an enclosed geometrical shape in the closed end of the scoop;

weakening the material of which the scoop is formed about the perimeter of the geometrical shape;

subsequently removing the material of the scoop included within the perimeter of the geometrical shape to form with the open end of the scoop a longitudinal channel in the scoop;

fitting the scoop into the access opening in the lid with the longitudinal axis of the longitudinal channel being substantially perpendicular to the plane in which the lid is disposed; and

locating the handle member on the scoop to cause at least a portion of the longitudinal axis of said handle member to extend substantially perpendicular to the plane in which the lid is disposed, the portion of the handle member serving as a perch and the longitudinal channel in the scoop serving as an entrance way into the interior of the bird nesting box.

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**4,166,433**

## TUYERES WITH INDEPENDENT COOLING CIRCUITS FOR NOSE AND BODY PORTIONS

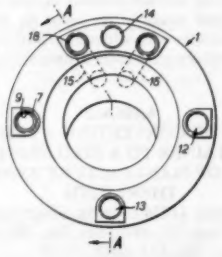
**James N. Kewin, Workington, England, assignor to British Steel Corporation, London, England**

**Filed Nov. 14, 1977, Ser. No. 851,376**

**Claims priority, application United Kingdom, Nov. 25, 1976, 49247/76**

**Int. Cl.[2] F22B *37/00*; F23L *1/00***

**U.S. Cl. 122—6.6** **12 Claims**



1. A cast tuyere comprising: an angular body having a hollow rear chamber and a nose portion; said nose portion having an arcuate nose channel therein having been formed by a removible frangible core around which the nose portion has been cast and defining a greater part of a toroid which has a cast inlet at one end and a cast outlet at the other end; coolant inlets and outlets for both the rear chamber and the nose channel; the coolant inlet for the nose channel including an inlet tube extending through the rear chamber for connecting with the cast inlet at said one end of the nose channel, which cast inlet is coextensive with the inlet tube to thereby provide a smooth coolant flow path through the nose channel.

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**4,166,434**

## VERTICAL TUBE FIRED HEATER AND PROCESS

**Robert H. Jensen, Clarendon Hills, Ill., and J. Wayne Morris, Wheeling, W. Va., assignors to UOP Inc., Des Plaines, Ill.**

**Filed Mar. 7, 1977, Ser. No. 775,232**

**Int. Cl.[2] F22B *21/30***

**U.S. Cl. 122—356** **4 Claims**

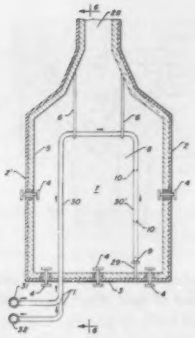
1. An apparatus for the indirect heating of mixed-phase fluids which comprises:

(a) a radiant heating chamber formed by a horizontal floor, a roof section and two pairs of opposing vertical sidewalls;

(b) a plurality of burners operably positioned within the radiant heating chamber;

(c) a flue gas outlet conduit communicating with the radiant heating chamber;

(d) a plurality of spaced apart tubular fluid conduits located within the radiant heating chamber, each fluid conduit



having at least one vertically oriented downward flow straight section;

(e) fluid inlet and fluid outlet means connected to the fluid conduits; and,

(f) at least two spaced apart vapor-liquid mixing means located within the downward flow straight sections of said fluid conduits.

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**4,166,435**

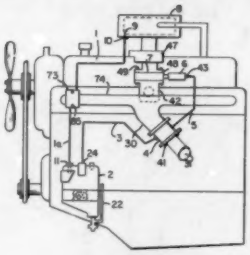
## INTERNAL COMBUSTION ENGINES

**Deh J. Kiang, 4FL, No. 45, Nanking East Rd., Sec. 4, Taipei, Taiwan**

**Filed Apr. 11, 1978, Ser. No. 895,320**

**Int. Cl.[2] F02D *19/00***

**U.S. Cl. 123—25 B** **11 Claims**



1. An internal combustion engine, including:

means defining at least one combustion chamber,

an exhaust manifold,

exhaust pipe means connected to the exhaust manifold for conducting exhaust gases away from the combustion chamber,

means defining an air inlet conduit whereby air for combustion of fuel is introduced into the combustion chamber, said air inlet conduit having a main inlet and at least one auxiliary inlet for introducing main and auxiliary air flows respectively into said air inlet conduit and being formed with a venturi constriction at a position downstream of said main inlet, said auxiliary inlet opening into said air inlet conduit at the position of the narrowest region of said constriction,

air filter means,

air heater means connected to receive filtered air from the air filter means for heating said filtered air and comprising

at least two members which are secured together to define a central opening through which said exhaust manifold extends, said members together defining a substantially annular passageway which extends about the exhaust manifold in heat-exchange relationship therewith and is provided with an inlet connection connected to the air filter means and with an outlet connection,

a humidifier connected to receive filtered and heated air from the air heater means for humidifying said filtered and heated air and comprising a vessel for containing humidification liquid, said vessel having an upper region at which it is provided with air inlet connection which is connected to the outlet connection of the air heater means and with an air outlet connection, the vessel having therewithin a sponge member having an upper surface which extends substantially horizontally within the vessel, the shape and size of the upper surface of the sponge member being substantially identical to the shape and size of the horizontal section of the interior space defined by the vessel at the level at which the upper surface is located.

preheater means connected to receive the filtered and humidified air from the humidifier for heating said air, and comprising a member which defines an opening of substantially the same diameter as the exhaust manifold and the exhaust pipe means and is connected in series between the outlet of the exhaust manifold and the inlet of the exhaust pipe means, and a duct passing diametrically through the opening and having an inlet end which is connected to the air outlet connection of the humidifier vessel and also having an outlet end, and

an air suction control valve connected between said preheater means and said auxiliary inlet to said air inlet conduit for controlling passage of air from said preheater means to said auxiliary inlet and comprising a valve body defining a passageway having two ends extending therethrough and connected at one end to said auxiliary inlet and at its other end to the outlet end of said duct, the passageway having a reduced diameter portion intermediate its ends, and the valve also comprising a ball positioned in the passageway between the reduced diameter portion and said one end, an abutment member between said ball and said one end, and a resilient member positioned in the passageway and effective between the abutment member and the ball to urge the ball towards said reduced diameter portion of the passageway for blocking the passageway, whereby said air suction control valve operates in response to increase in pressure in the combustion chamber to reduce the flow of air from the preheater means to the auxiliary inlet.

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**4,166,436**

## COMBUSTION CHAMBER OF AN INTERNAL COMBUSTION ENGINE

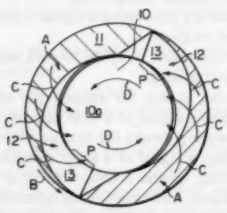
**Yoshio Yamakawa, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Aichi, Japan**

**Filed Mar. 16, 1977, Ser. No. 778,230**

**Claims priority, application Japan, Nov. 15, 1976, 51-136243**

**Int. Cl.[2] F02F *3/28, 3/24***

**U.S. Cl. 123—30 C** **5 Claims**




1. An internal combustion engine comprising:

a cylinder block,

a cylinder head mounted on said cylinder block,

a piston reciprocally movable in said cylinder block, said cylinder head and said piston defining a combustion chamber having a fixed volume therebetween when said piston reaches the top dead center,

an intake valve in said cylinder head for leading a combustible mixture into said combustion chamber,

an exhaust valve in said cylinder head for discharging the exhaust gas to the atmosphere, said piston head having a central recess in the form of a shallow cylinder defined by a circumferential wall and a bottom wall, an annular peripheral portion of said piston head surrounding said recess and including a flat portion for creating a squish flow of a combustible mixture and a contoured outwardly widening groove portion connecting, continuously along its length, the bottom of said recess with said region of squish flow to guide said squish flow circumferentially and radially inwardly to cause a direct impingement of said squish flow upon the bottom wall of said recess and for creating a turbulence and a strong swirl motion of the combustible mixture therein, and

a spark plug having a spark gap located in said combustion chamber.

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**4,166,437**

## METHOD AND APPARATUS FOR CONTROLLING THE OPERATING PARAMETERS OF AN INTERNAL COMBUSTION ENGINE

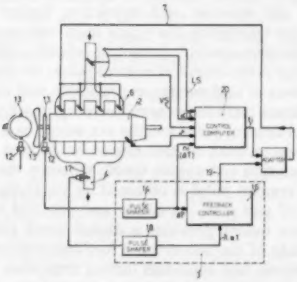
**Valerio Bianchi, Hochdorf; Reinhard Latsch, Vaihingen-Enz, and Peter-Jürgen Schmidt, Schwieberdingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

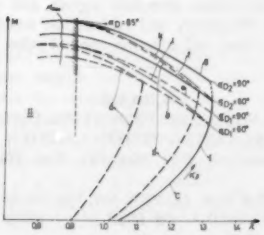
**Filed Jul. 26, 1977, Ser. No. 819,189**

**Claims priority, application Fed. Rep. of Germany, Jul. 27, 1976, 2633617**

**Int. Cl.[2] F02D *5/00***

**U.S. Cl. 123—32 EC** **20 Claims**





1. A method of operating an internal combustion engine by controlling the magnitude of an operating parameter, said parameter being one of the class which includes fuel injection

control pulses, ignition timing, exhaust gas recycle rate and the like, and comprising the steps of:

monitoring the magnitude of state variables of the engine, said state variables being one or more of the class which includes engine speed, air flow rate, induction tube pressure, throttle valve position, exhaust gas composition and the like, and using the magnitude of said state variables to derive therefrom the appropriate setting for said operating parameter;

comparing at least one of said state variables temporarily with a set-point value for providing a feedback correction signal for said operating parameter;

and wherein said step of providing a feedback correction signal for said operating parameter occurs only when the engine operates in specific conditions and wherein the correction signal is maintained constant and equal to the last value obtained by feedback control when said engine is operated purely on the basis of said stored set of data of said operating parameter;

whereby errors due to wear and aging and other influences are compensated for.

9. An apparatus for operating an internal combustion engine by controlling the magnitude of an operating parameter, said parameter being one of the class which includes fuel injection control pulses, ignition timing, exhaust gas recycle rate, and the like, comprising:

means for detecting the magnitude of one or more state variables of said engine, said state variables being of the class which includes engine speed, air flow rate, induction tube pressure, throttle valve position, exhaust gas composition, and the like; and for generating detection signals related thereto;

control computer means for receiving at least two of said detection signals and for deriving therefrom the magnitude of said operating parameter;

feedback circuit means, for receiving a further one of said detection signals and for comparing it with as set-point value and for providing, temporarily, a correction signal for correcting the magnitude of said operating parameter and wherein said further detection signal is the signal from an oxygen sensor located in the exhaust system of the engine and wherein said apparatus further comprises means for translating the signal from said oxygen sensor into a bivalent control signal and wherein said operating parameter is the length of control pulses for the fuel injection valves of said engine, and wherein said control computer means includes a digital memory in which values of said fuel control pulse lengths are stored as a function of the characteristics of said engine as defined by throttle valve position and engine speed; whereby the magnitude of said control pulse is obtained by supplying prevailing values of said state variables, and wherein said control computer means provides a digital word related to the magnitude of the uncorrected fuel injection control pulse and wherein said apparatus further comprises a converter circuit receiving said digital word and also receiving a correction frequency from a further circuit which transforms said further detection signals and wherein said correction frequency and said digital word are used to generate a final fuel injection control pulse.

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**4,166,438**

## MACHINE WITH RECIPROCATING PISTONS AND ROTATING PISTON CARRIER

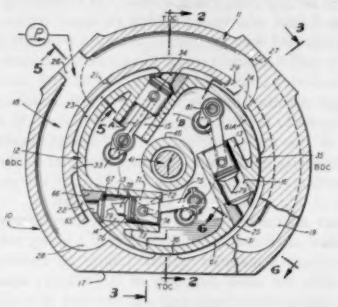
**Eldon W. Gottschalk, P.O. Box 294, Port Hueneme, Calif. 93041**

**Filed Nov. 11, 1976, Ser. No. 741,063**

**Int. Cl.[2] F02B** *57/00;* **F01B** *13/04;* **F04B** *19/02*

**U.S. Cl. 123—43 R** **1 Claim**

1. In a fluid machine having input and output ports in a housing surrounding a work shaft and means for conducting fluid to a port, the combination comprising a carrier rotatable within the housing, an uneven plurality of cylinders in the carrier, an uneven plurality of pistons each reciprocable in a cylinder, said carrier being fixed to said work shaft, a crankshaft rotatable by each piston, a crank gear on each crankshaft, a ring gear fixed to said housing and meshing with each crank gear, a carrier passage from each cylinder to the carrier periphery, a peripheral annulus in the housing about the carrier communicating with said passages, and a plurality of gates dividing the peripheral annulus arcuately into a plurality of peripheral cavities, said input and output ports connecting each to an



arcuate manifold chamber, said arcuate manifold chamber being defined by a manifold inner wall surrounding said peripheral cavities and a manifold outer wall spaced from said inner wall, said arcuate manifold chamber further having a radial web dividing said chamber into two transversely separated manifold chambers; a port between each peripheral cavity and an arcuate manifold chamber, a transverse web defining the arcuate extent of each arcuate manifold chamber; and means for impelling said carrier with respect to said housing.

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**4,166,439**

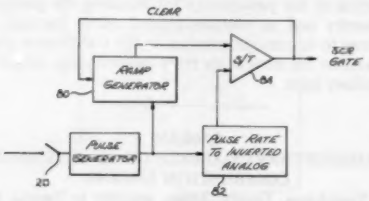
## MODIFIED ENGINE CONTROLLING SYSTEM

**Hanan Golan, 31 Baal Shem-Tov, Holon, Neot Rabel, Israel**

**Filed Oct. 21, 1977, Ser. No. 844,461**

**Int. Cl.[2] F02P** *5/04;* **F02B** *3/00*

**U.S. Cl. 123—117 R** **1 Claim**




1. In an internal combustion engine having an ignition system for providing a timed spark to ignite the fuel and air mixture, said system being of the variety which includes an electronic switch such as the capacitive discharge-type ignition system, an improvement comprising:

a sensing means for providing a signal representative of the speed of said engine;

an electronic controller coupled to said sensing means, said controller comprising:

(i) first storing means for storing the magnitude of said sensing means signal at a first instant of time;

(ii) second storing means for storing the magnitude of said sensing means signal at a second instant of time; and

(iii) comparing means coupled to said first and second storing means, said comparing means being a means for comparing said stored magnitudes and for providing an output control signal indicative of the relative magnitudes of said stored magnitudes;

adjustment means coupled to said electronic controller, said adjustment means including:

(i) means for generating a first electronic signal having a voltage which is a function of said output control signal;

(ii) means for generating a second electronic signal having a ramp voltage; and

(iii) a Schmitt trigger for comparing the magnitudes of said first and second electronic signals and providing a switching signal to said electronic switch when said first and second signals are equivalent;

whereby said timed spark will be automatically adjusted to maximize the speed of said engine.

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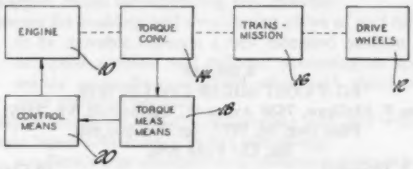
## 4,166,440
## ENGINE CONTROL SYSTEM UTILIZING TORQUE CONVERTER SLIP

**Uuno V. Helava, Hanover, Fed. Rep. of Germany, and Jack R. Phipps, St. Claire Shores, Mich., assignors to The Bendix Corporation, Southfield, Mich.**

**Filed Sep. 29, 1977, Ser. No. 837,782**

**Int. Cl.[2] F02P 5/14**

**U.S. Cl. 123—117 R** **10 Claims**




1. An engine control system for use in an automotive vehicle having an internal combustion engine coupled with vehicle drive wheels through a power train including a fluid coupling, said fluid coupling including an impeller coupled with the engine and a turbine coupled with the drive wheels, said control system comprising measuring means coupled with said fluid coupling for producing an electrical control signal which varies in accordance with slip speed in the fluid coupling, and engine control means connected with said measuring means and with the engine and being responsive to said control signal for changing the value of an engine operating parameter.

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## 4,166,441
## COMPRESSED AIR-ACTUATED FLUID INJECTION APPARATUS

**Gilbert R. Grigsby, 125 W. Ave. 29, Los Angeles, Calif. 90031**

**Filed Aug. 9, 1977, Ser. No. 823,398**

**Int. Cl.[2] F02M 1/16**

**U.S. Cl. 123—180 R** **28 Claims**

1. In a vehicle having an on-board compressed air system and an internal combustion engine including a plurality of cylinders, an injector apparatus for supplying starting fluid to the cylinders of said engine when said engine is being started, said injector apparatus comprising:

a starting fluid reservoir;

a metering chamber;

a first fluid path connecting said reservoir to said metering chamber;

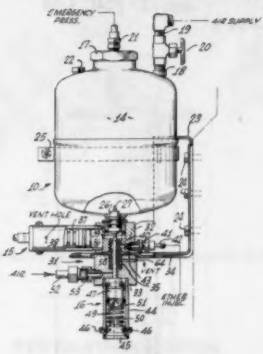
first valve means for controlling the outward flow of fluid from said reservoir;

a starting fluid delivery outlet;

a second fluid path connecting said metering chamber to said delivery outlet;

second valve means for controlling the flow of fluid from said metering chamber to said fluid delivery outlet;

actuator means for operating said first and second valve means in sequence to exhaust said metering chamber through said fluid-delivery outlet and then to refill said metering chamber from said reservoir, said actuator means comprising an air cylinder, a piston reciprocable within said air cylinder and operatively associated with said first and second valve means, a compressed air inlet permitting operation of said piston by supplying compressed air to said air cylinder, and an air escape outlet




allowing air to escape from said system through said piston at a controlled rate; and

an air line connecting said on-board compressed air system to said compressed air inlet whereby said actuator means is operated by said on-board compressed air system.

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## 4,166,442
## PROTECTION OF INTERNAL COMBUSTION ENGINES AND/OR VEHICLES EMBODYING THE SAME

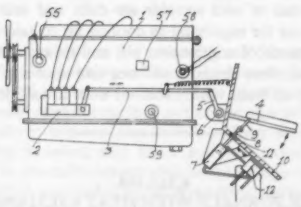
**Henning M. Henderson, Willowdale, Canada, and Burton Weakley, Verwoerdburg, South Africa, assignors to Computer Driver Control Holdings (Proprietary) Limited, South Africa**

**Filed May 4, 1977, Ser. No. 793,874**

**Claims priority, application South Africa, May 6, 1976, 76/2711; May 6, 1976, 76/2713; Sep. 28, 1976, 76/5827; Feb. 16, 1977, 77/0921**

**Int. Cl.[2] F02B 77/08**

**U.S. Cl. 123—198 D** **16 Claims**



1. A protective device for a combination including an internal combustion engine and a clutch operatively coupled thereto wherein the clutch is capable of slip during engagement and disengagement thereof, the protective device comprising:

at least one first means for detecting an abnormal operating condition of a part of said combination;

second means, actuated by said first means, for at least partially dethrottling said engine upon detection of said abnormal condition;

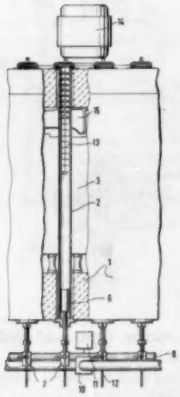
third means operatively connected with said first means for disengaging the clutch substantially simultaneously with the activation of said second means for dethrottling the engine.

4,166,443

## JET PIPE BURNER

Carl-Heinz Stiasny, Bruneck, Italy, assignor to Birfield Trasmissioni S.p.A., Bruneck, Italy

Filed Jul. 7, 1977, Ser. No. 813,662
Claims priority, application Italy, Aug. 24, 1976, 26470 A/76
Int. Cl.[2] F24C 3/06
U.S. Cl. 126—91 A 2 Claims



1. In a jet pipe burner assembly for heating the interior of an industrial furnace including a jet pipe, a burner head having a front face with orifice means formed in said front face and arranged within said jet pipe, means for supplying combustion air and fuel gas to said burner head, means for connecting a source of combustion air and a source of fuel gas to said supply means, and means connected with said supply means for controlling said supply of combustion air and fuel gas to said burner head, wherein the improvement comprises heat dissipating means constructed in a configuration laterally enclosing said burner head within said jet pipe for dissipating heat from said burner head, said heat dissipating means comprising annular wall means arranged concentrically with said burner head, said annular wall means defining together with the outer surface of said burner head an annular air duct extending laterally around and forward of the front face of said burner head in concentric relationship therewith, a conduit connected between one end of said annular air duct and said source of combustion air for supplying as cooling air to said air duct air from said source of combustion air, and means defining at an end of said air duct opposite said one end openings for passing said cooling air from within said air duct to said jet pipe.

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4,166,444

## FIREPLACE FURNACE WITH HEAT EXCHANGE TUBES

Donald S. Martenson, 14935 S. Leland Rd., Beavercreek, Oreg. 97004

Filed Oct. 20, 1977, Ser. No. 843,986
Int. Cl.[2] F24B 1/18
U.S. Cl. 126—121 13 Claims

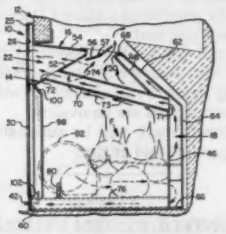
1. A wood-burning furnace for insertion as a unit in an existing fireplace comprising:

a firebox,

a jacket encompassing and spaced from the opposite sides and back of said firebox to define an airspace between said firebox and jacket and air inlet openings into said airspace between frontal side portions of said jacket and firebox,

said firebox walls comprising heat exchange surfaces for heating air passing through said airspace,

and multiple heat exchange tubes passing through said firebox from air intake openings communicating with said airspace at the rear of said firebox to air discharge openings communicating with ambient air at a frontal portion of said firebox.



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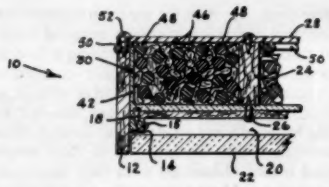
4,166,445

## LOW COST SOLAR COLLECTOR

Thomas F. McGraw, 7538 Axton St., Springfield, Va. 22151

Filed Dec. 30, 1977, Ser. No. 866,188
Int. Cl.[2] F24J 3/02
U.S. Cl. 126—432 10 Claims



1. A solar collector comprising a housing in the form of a frame-like structure having a plurality of sides and a base, a first and second opening located in said housing, said first opening located at one end of said housing and said second opening located at the other end of said housing, a first conduit extending into said housing through said first opening in a predetermined longitudinal direction, a second conduit extending into said housing through said second opening in a direction parallel to said predetermined longitudinal direction of said first conduit, each of said conduits being perforated, said perforations being of a predetermined size and located in that portion of said conduits located within said housing, a heat absorbing material positioned upon said base, encompassing said first and second conduits and substantially filling said housing, said heat absorbing material being in the form of pellets of marble-size, renewable-resource-material, said size of said heat absorbing material being greater than said predetermined size of said perforations, a transparent cover sealing said heat absorbing material within said housing whereby a working fluid entering said first perforated conduit flows from said first conduit through said perforations therein, passes through said heat absorbing material and enters said second conduit through the perforations therein upon the positioning of said solar collector substantially in optical alignment with a source of solar energy, the temperature of said working fluid exiting said second conduit being higher than the temperature of said working fluid entering said first conduit.

**4,166,446**

## SOLAR COLLECTOR

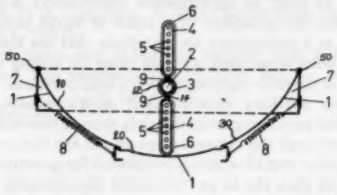
**John A. Youngs, Klingnau, Switzerland, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland**

**Filed Sep. 30, 1977, Ser. No. 838,302**

**Claims priority, application Switzerland, Dec. 3, 1976, 15239/76**

**Int. Cl.[2] F24J *3/02*; G02B *5/10***

**U.S. Cl. 126—438** **5 Claims**



1. A solar collector comprising:

a reflector containing overlapping plates;

support means for supporting said reflector;

means for enabling said overlapping plates of said reflector to be movable between a first extended position and a collapsed position, said reflector possessing an approximately semicylindrical shape when said plates assume their extended position;

liquid-containing elements cooperating with said reflector;

said liquid-containing elements comprising:

a collector pipe enclosed by a protective tube; and

radial elements carried by and extending in the longitudinal direction of the collector pipe;

means mounting said collector pipe and said radial elements to be rotatable.

5. A solar collector comprising:

reflector means comprising a plurality of at least partially overlapping plates;

support means for supporting said reflector means;

means mounting said overlapping plates of said reflector means to be movable between a first extended position and a collapsed position, said reflector means possessing an approximately semicylindrical shape when said plates assume their extended position;

liquid-conducting elements cooperating with said reflector means;

said liquid-conducting elements comprising:

a collector pipe: and

a plurality of radial elements supported by said collector pipe: and

means rotatably mounting said collector pipe and said radial elements.

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**4,166,447**

## DECORATIVE FIREPLACE STANDARD FOR LOG GRATE

**James M. Creim, Nashville, Tenn., assignor to Cumberland Valley Metals, Inc., Nashville, Tenn.**

**Filed Dec. 12, 1977, Ser. No. 859,380**

**Int. Cl.[2] F24B *13/00***

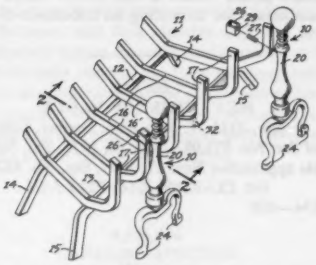
**U.S. Cl. 126—298** **5 Claims**

1. A decorative fireplace standard assembly for attachment to a log grate having at least one, substantially vertical, front, upright member of substantially uniform cross-section and having a free upper end, comprising:

(a) a decorative upright standard having front and rear surfaces, and a base adapted to rest on the hearth of a fireplace,

(b) a sleeve member having a front adapted to coaxially receive the front upright member,

(c) a connector stem having opposite end portions connected respectively to the rear surface of said standard and the front of said sleeve member, to support said standard in an



upright operative position upon the hearth in front of said log grate.

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**4,166,448**

## VENTILATION SYSTEM

**Gerald K. Miller, 2909 Windsor Forest Dr., Louisville, Ky. 40272, and William G. Wooden, 6020 Chenoweth Dr., Louisville, Ky. 40299**

**Filed Oct. 28, 1977, Ser. No. 846,404**

**Int. Cl.[2] F24C *15/20***

**U.S. Cl. 126—299 D** **10 Claims**

1. A ventilation system for removing and filtering fumes in the space above a cooking surface, which comprises:

A. a hood of single wall non-plenum construction located above said cooking surface and covering a portion of the space above said cooking surface to form an entrainment chamber between said hood and said cooking surface which is generally coextensive with the area of said cooking surface and including an open front portion;

B. air intake means in operative relation with said hood and having an intake blower means for introducing air from the outside into the entrainment chamber;

C. air spreading and diffusion means in the top of said hood and in open communication with said air inlet means and said entrainment chamber for equalizing the volume of air delivered from said air intake means into the entrainment chamber and for spreading and diffusing said air across the horizontal plane of said entrainment chamber so as to conform generally with the area of the cooking surface;

D. exhaust means in operative relation with said hood and including

1. an exhaust duct, and

2. an exhaust blower means;

E. filter means situated between said hood and said exhaust duct;

F. the improvement of static regulating means to balance the static pressure of said intake means and said exhaust means; and

G. pressure sensor means in said intake means and in said exhaust means for indicating an imbalance of static pressure.

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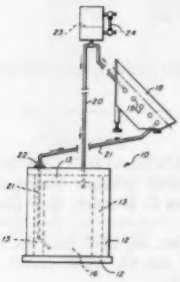
**4,166,449**

## HEAT STORAGE VAULT

**Walter L. Depew, 3111 W. 54th Ave., Denver, Colo. 80221**

**Division of Ser. No. 572,083, Apr. 28, 1975, Pat. No. 4,064,865.**
**This application Nov. 17, 1977, Ser. No. 852,417**
**Int. Cl.[2] F24H *7/00*; F24J *3/02***
**U.S. Cl. 126—400** **3 Claims**



1. A heat storage vault, comprising:

an insulated enclosure of fixed dimensions;

a plurality of independent, serpentine pipes each being isolated from the other serpentine pipes and each having substantially linear lengths extending back and forth within the enclosure with the lengths thereof substantially equidistantly spaced both from the closest length of the same pipe and equidistantly spaced from each closest length of each of the other independent serpentine pipes; and

a heat storage medium filling the enclosure and the space between the serpentine pipe lengths;

whereby substantial amounts of heat energy may be invested in the heat storage medium by one of the serpentine pipes and heat energy may be withdrawn from the heat storage medium by at least one other of the serpentine pipes.

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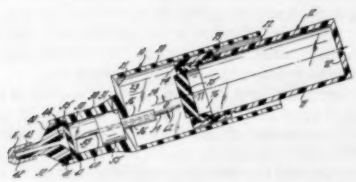
**4,166,450**

## DEVICE AND PROCEDURE FOR COLLECTING A SUCCESSION OF INTRAVENOUS BLOOD SAMPLES

**Harvey J. Abramson, New York, N.Y., assignor to Metatech Corporation, Northbrook, Ill.**

**Filed Jul. 22, 1977, Ser. No. 817,929**
**Int. Cl.[2] A61B *5/14***
**U.S. Cl. 128—764** **3 Claims**



1. In a blood sample collection system for use with an intravenous needle, the combination comprising a pre-evacuated vial having an extensive rubber cap, a carrier in the form of a large cylindrical cup defining a main chamber and a small cylindrical cup defining a mid-chamber, the cups having their mouths facing in opposite directions and being integral with one another base-to-base to form a thin common barrier between them and with their axes parallel and offset from one another to a degree that adjacent portions of the sidewalls thereof are substantially flush, the cups communicating via a clearance opening through the barrier and which is axially aligned with respect to the axis of the small cup, a readily-penetrated soft rubber disc at the mouth of the small cup, an end fitting secured to the mouth of the small cup adjacent the rubber disc for coupling to the intravenous needle and having an axial passageway formed therein, the end fitting being formed of transparent plastic and the axial passageway being relieved to form an antechamber immediately adjacent the rubber disc for reception of a trace of blood under venous pressure as a preliminary visual telltale that the lumen of the vein has been penetrated, a piston fitted for sliding movement endwise in the mid-chamber between limit positions, the piston having an auxiliary double-ended needle axially mounted therein and projecting from the ends thereof one end of which extends through the clearance opening in the common barrier and the other end of which is positioned for penetration of the soft rubber disc, the large cylindrical cup slideably receiving said vial with the rubber cap positioned for penetration by the one end of the auxiliary needle so that when the vial is pressed in, cap-first, the auxiliary needle first penetrates the soft rubber disc to establish communication with the intravenous needle and then penetrates the rubber cap on the vial in a random eccentric position to establish communication between the vial and the intravenous needle for the drawing of a sample of blood into the vial, and with the auxiliary needle being drawn from the rubber disc and then from the cap for resealing of the same when the vial is subsequently removed.

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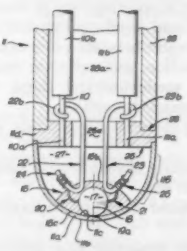
**4,166,451**

## HEAT SENSING INSTRUMENT PROBE

**Edmond A. Salera, 714 Surf View Dr., Santa Barbara, Calif. 93109**

**Filed Aug. 26, 1977, Ser. No. 827,845**
**Int. Cl.[2] A61B *5/00*; G01K *7/22***
**U.S. Cl. 128—736** **8 Claims**



1. In local body heat source sensing instrumentation, the combination comprising

(a) a probe including a heat conductive, metallic tip having an outer surface shaped for application in heat transfer proximity with a patient's body,

(b) non-metallic material at the inner side of said tip, said material characterized as electrically insulative and heat conductive, and

(c) electrically energizable means embedded in said material at a location to detect heat transfer between said surface and source, via said tip and said material,

(d) the tip having the shape of a shell, with a convex outer surface,

(e) said means having two electrical leads, there being a heat an electrically insulative header mounting the shell and there being space between said material and the header, and there being auxiliary electrical wires extending through the header and into said space and connected to said leads at locations where the leads project from said

material, the header extending transversely crosswise of the shell,

(f) there being two main wires that terminate at and are supported by the header, said auxiliary wires respectively connected to said two main wires at the side of the header opposite the shell.

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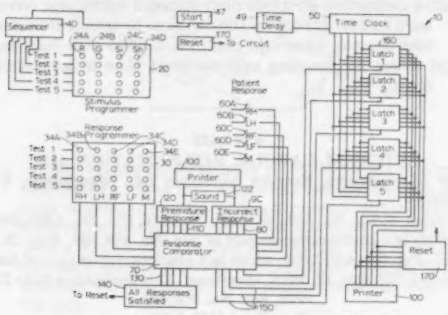
## 4,166,452
## APPARATUS FOR TESTING HUMAN RESPONSES TO STIMULI

**Constantine D. J. Generales, Jr., 115 Central Park West, New York, N.Y. 10023**

**Continuation-in-part of Ser. No. 682,495, May 3, 1976, abandoned. This application Jan. 5, 1978, Ser. No. 866,958**

**Int. Cl.[2] A61B *5/16***

**U.S. Cl. 128—741** **22 Claims**




1. Apparatus for testing human responses to stimuli, comprising

(a) a plurality of stimuli including tactile stimuli;

(b) means for selecting and setting into program each of said stimuli;

(c) response means for operation by a subject under test, including a device arranged to furnish indications as a result of relative movement of the jaws of a subject under test on application of a stimulus;

(d) a clock coupled to said stimuli and to said response means for registering the time which elapses after the start of a test and the operation of a stimulus for the subject to provide a response; and

(e) means for controlling and interrelating the operation of said stimuli, said response means and said clock.

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## 4,166,453
## BODY ELECTRODES

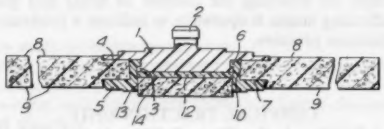
**Brian McClelland, County Antrim, Northern Ireland, assignor to Cardio Technology Limited, Dublin, Northern Ireland**

**Filed Jan. 17, 1978, Ser. No. 870,251**

**Claims priority, application United Kingdom, Jan. 21, 1977, 2513/77**

**Int. Cl.[2] A61B *5/04***

**U.S. Cl. 128—639** **5 Claims**



1. An electrode which is suitable for use in conducting electrical signals from the skin of a living animal, the said electrode including a member to which electrical connection can be made, the member being constituted by an electrically conducting plastics material, a first element carrying an electrically conducting gel, means for holding said first element to allow said first element to be positioned on the skin of an animal with the gel in electrical contact with the said skin and a silver loaded element of nonelectrically conducting material positioned between said first element and said member to provide a physical barrier between said member and first element to substantially prevent gel from reaching said member and an electrical connection via the silver loading between the gel and the member, whereby an electrical connection can be made between the skin and the member and the possibility of developing an off-set potential is reduced.

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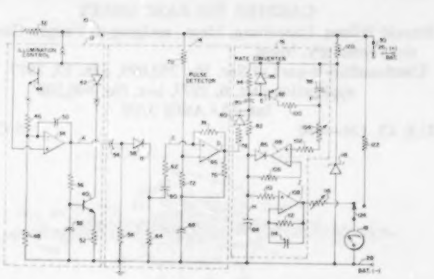
## 4,166,454
## CARDIAC MONITOR

**Robert Meijer, 3117 D. N. Orchard St., Chicago, Ill. 60657**

**Filed Feb. 17, 1977, Ser. No. 769,705**

**Int. Cl.[2] A61B *5/02***

**U.S. Cl. 128—666** **14 Claims**



8. A cardiac monitor for monitoring cardiac activity including means for generating and directing light at the skin of the individual to be monitored and means for detecting the reflected light modulated by the pulsatile flow of blood beneath the skin, said monitor including:

means for detecting substantially the peak of the systolic pulse in the cardiac cycle, said detecting means including means for generating a signal indicative of the reflected light, means for automatically storing a charge level indicative of the peak of said reflected light signal, means for comparing each signal pulse occurring in said reflected light signal to said stored charge level, and means for generating a pulse indicative of each systolic pulse only when a succeeding signal pulse has a peak substantially equal to said charge level;

means for generating a signal indicative of each detected pulse peak; and

means for converting the time interval between signals to a signal indicative of the heartbeat rate.

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## 4,166,455
## APPARATUS AND METHOD FOR NON-INVASIVE DETECTION OF STRICTURES IN CONDUCTIVE FLUID CONDUITS

**Eugene Findl, Amityville, N.Y., and Robert J. Kurtz, Cliffside Park, N.J., assignors to Howmedica Inc., New York, N.Y.**

**Filed Jan. 25, 1978, Ser. No. 872,035**

**Int. Cl.[2] A61B *5/02***

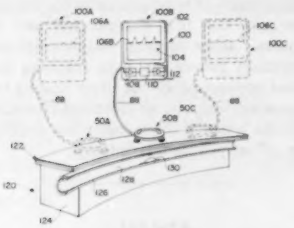
**U.S. Cl. 128—691** **12 Claims**

1. A method for detecting the location of a constriction in an ionically conductive vessel through which a conductive fluid is flowing comprising

detecting the streaming potential at a plurality of locations along the length of the vessel; and

comparing the plurality of detected streaming potentials,

and selecting the detected streaming potential which has the highest relative magnitude, said constriction being



located in the corresponding location where said highest streaming potential was detected.

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**4,166,456**

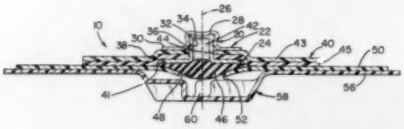
**CARRIER RELEASE SHEET**

**Ronald Wilson, Lunenburg, Mass., assignor to Vaughn Corporation, Salisbury, Mass.**

**Continuation-in-part of Ser. No. 760,099, Jan. 17, 1977. This application Oct. 6, 1977, Ser. No. 840,108**

**Int. Cl.[2] A61B 5/04**

**U.S. Cl. 128—640** **15 Claims**



1. In combination with a biopotential skin electrode of the type including a stud, a reservoir of electrically-conductive material in electrical contact with said stud, a base sheet secured to said stud so that said reservoir is exposed to one side of said base sheet, and an adhesive coating disposed on said one side of said base sheet, an improved carrier release sheet supporting said electrode, said carrier release sheet comprising:

a unitary, water impervious, substantially self-supporting sheet (1) having a slit formed across a portion of said self-supporting sheet so as to form a tab and (2) dimensioned so as to completely cover said one side of said base sheet including said adhesive coating and having a portion of said tab extending beyond the peripheral edge of said base sheet with said tab covering a smaller portion of said adhesive coating than the remaining portion of said self-supporting sheet covers so that said self-supporting sheet seals said electrically-conductive material in said reservoir from the surrounding air and so that said self-supporting sheet is easily removable from said adhesive coating by pulling said tab relative to said adhesive coating.

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**4,166,457**

**FLUID SELF-SEALING BIOELECTRODE**

**Stephen C. Jacobsen; Robert L. Stephen; Richard D. Luntz; Richard T. Johnson; David F. Knutti, and Carl F. Mandleco, all of Salt Lake City, Utah, assignors to University of Utah Research Institute, Salt Lake City, Utah**

**Continuation-in-part of Ser. No. 714,942, Aug. 16, 1976. This application Nov. 14, 1977, Ser. No. 851,082**

**Int. Cl.[2] A61B 5/04**

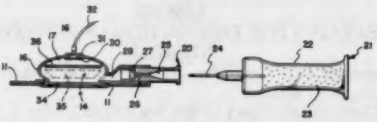
**U.S. Cl. 128—639** **16 Claims**

1. A self-sealing bioelectrode for use with electrode fluids including:

(a) a sheet-like base member having a base opening therethrough, and adapted at a bottom surface thereof for conforming contact at a skin surface;

(b) a receptacle having an opening which is attached at said base member to define a fluid channel through said base opening to the interior of said receptacle;

(c) an injection channel means communicating between the exterior and interior of said receptacle for filling said receptacle with fluid when affixed at said skin surface, said channel means having restricted access means for passing



said fluid into said receptacle while precluding subsequent introduction of other fluids therethrough;

(d) a conductive electrode plate disposed within said receptacle interior at such location so as to be remote from said base opening when said electrode is filled with fluid; and

(e) means for coupling said electrode plate to an electric circuit.

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**4,166,458**

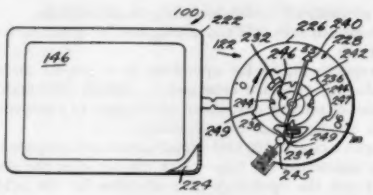
**EXTERNAL CARDIAC RESUSCITATION AID**

**Roy M. Harrigan, Bromley Mountain Rd., Manchester, Vt. 05254**

**Division of Ser. No. 688,348, May 20, 1976, Pat. No. 4,095,590, which is a continuation-in-part of Ser. No. 609,109, Aug. 29, 1975, Pat. No. 4,077,400, which is a continuation-in-part of Ser. No. 541,762, Jan. 17, 1975, abandoned. This application May 22, 1978, Ser. No. 908,467**

**Int. Cl.[2] A61H 1/00**

**U.S. Cl. 128—24 R** **11 Claims**



1. Apparatus for use by a rescuer in administering cardiopulmonary resuscitation to a patient or for use as a training aid in the application of cardiopulmonary resuscitation comprising:

means for receiving manually applied pressure;

sensing means in operative relationship with said pressure receiving means for sensing pressure applied to said pressure receiving means;

means in operative relationship with said sensing means for indicating the pressure applied to said pressure receiving means;

said pressure receiving means including means for distributing said applied pressure over a predetermined area; and

means in operative relationship with said pressure indicating means for counting the number of times said pressure indicating means is operative to indicate a predetermined minimum pressure.

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**4,166,459**

**CERVICAL TRACTION UNIT**

**Frank J. Nightingale, San Diego, Calif., assignor to Union Camp Corporation, Wayne, N.J.**

**Filed Jun. 29, 1977, Ser. No. 810,967**

**Int. Cl.[2] A61H 1/02**

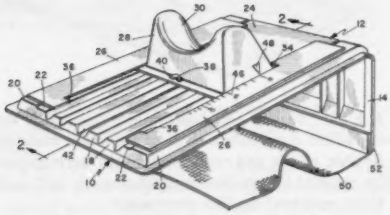
**U.S. Cl. 128—75** **2 Claims**

1. A cervical traction unit, comprising:

an elongated platform having a substantially rigid rear end

wall extending downwardly from said platform, said wall being adapted to engage one end of a support on which the platform is placed,

a flexible flap being of such degree of flexibility that it may at any point be bent to an angle of at least 90° with substantially no permanent deformation occurring in the material of the flap, said flap being secured to said wall for insertion under a support to secure the platform thereon, said rear wall and said flap acting together to hold the platform against longitudinal displacement when the unit is mounted on a support;



a carriage longitudinally slidably mounted on said platform and having a raised neck supporting member thereon, the neck supporting member having a recessed neck receiving yoke to receive the neck of a user supine on the support, with a downwardly inclined rear wall portion to engage the user's head substantially under the base of the skull for applying traction to the otherwise unrestrained head of the user;

and tension means connected between said carriage and the rear end portion of said platform to bias the carriage rearwardly.

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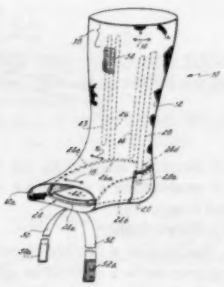
**4,166,460**

## ANKLE PROTECTOR

**Leslie T. Applegate, Cincinnati, Ohio, assignor to Surgical Appliance Industries, Inc., Cincinnati, Ohio**

**Filed Sep. 19, 1977, Ser. No. 834,443**
**Int. Cl.[2] A61F *3/00***
**U.S. Cl. 128—80 H** **7 Claims**



1. An ankle protector comprising:

a sleeve having ankle and heel sections dimensioned and configured to snugly encircle at least the ankle and heel of a wearer, said sleeve being elastic in at least a circumferential direction,

first and second semi-rigid stays secured to opposite sides of said ankle section, said stays being disposed generally parallel to the longitudinal axis of said ankle section, said stays each having upper and lower ends,

a heel cup exhibiting semi-rigid characteristics having a bottom and opposite side walls to receive the heel of a wearer, said opposite side walls being dimensioned and configured to snugly embrace substantially the entirety of the sides of the wearer's heel, said heel cup being disposed within said heel section of said sleeve,

means connecting the lower end of each of said stays to a different one of said opposite side walls of said heel cup for pivotal movement about an axis parallel to the normal flexure axis of a wearer's ankle encountered during walking, thereby facilitating comfortable walking action while inhibiting undesirable lateral ankle motion associated with a sprain.

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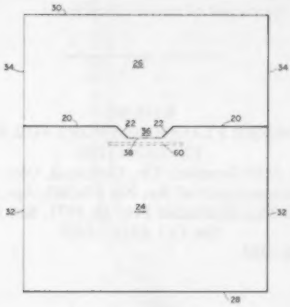
**4,166,461**

## SURGICAL DRAPE

**Don W. Oliver, and John L. Dale, both of Memphis, Tenn., assignors to The Buckeye Cellulose Corporation, Cincinnati, Ohio**

**Filed Feb. 10, 1978, Ser. No. 876,827**
**Int. Cl.[2] A61F *13/00***
**U.S. Cl. 128—132 D** **14 Claims**



1. A unitized surgical head drape comprising a single generally rectangular sheet of flexible sheet material which is a barrier to bacterial migration provided with a pair of opposed and spaced apart side slits extending oppositely inwardly of both side edges to define a connecting tab portion integrally connecting a base sheet panel portion adapted to be disposed beneath a patient's head and covering the head end portion of an operating table with a turban sheet panel portion adapted to be turban wrapped around the patient's head.

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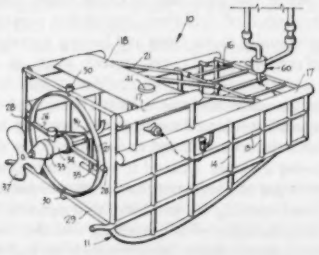
**4,166,462**

## SELF-PROPELLED SHARK-PROOF CAGE

**James M. Ellis, New West Rd., Port Lincoln, Australia (5606)**

**Filed Aug. 5, 1976, Ser. No. 711,815**
**Claims priority, application Australia, Sep. 4, 1975, PC3048**
**Int. Cl.[2] B63C *11/42***
**U.S. Cl. 128—145 R** **12 Claims**



1. A self-propelled shark-proof cage comprising:

an elongated frame, and wall means mounted on said frame for preventing sharks from entering the cage,

said wall means including an upper wall and a base wall, a first access opening in said upper wall and a second access opening in said base wall, and a hatch door hinged to said upper wall and adapted to releasably overlie said first access opening and, when closed, to be retained in that state by the effects of gravity,

a propeller mounting frame mounted on one end of said cage frame, pivot means coupling said propeller mounting frame to said cage frame for pivotal movement of said propeller mounting frame about two axes at right angles to each other, an air motor and a propeller mounted on said propeller mounting frame, and transmission means drivingly coupling said air motor to said propeller,

buoyancy means mounted on said cage frame, said buoyancy means comprising a buoyancy control air tank secured to said upper wall and extending transversely to the opposite sides of said cage frame, and

an air line coupled to said air motor and having coupling means thereon enabling connection of said air motor air line to the output of an air compressor.

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**4,166,463**

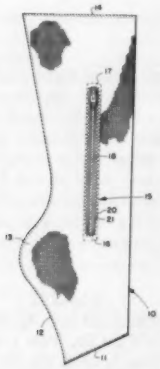
## ZIPPERED ELASTIC SUPPORT FOR BODY EXTREMITIES

**Ann Bloom, 4133 Greenvale Dr., Cleveland, Ohio 44121**

**Continuation-in-part of Ser. No. 676,901, Apr. 14, 1976, abandoned. This application Feb. 22, 1977, Ser. No. 770,417**

**Int. Cl.[2] A61F *13/08***

**U.S. Cl. 128—165** **2 Claims**



1. Elastic support hosiery comprising a stocking adapted to be placed over the foot and surrounding the ankle and at least the lower calf of the user, said stocking being made from a single unitary piece of uniformly stretchable woven spandex folded longitudinally at the front and having a stretch seam at the back of said stocking, said unitary piece of uniformly stretchable woven spandex being profiled at said seam at the back to form the ankle, heel and at least a portion of the bottom of the foot, said stocking having a top opening being hem stitched with a stretch stitch and an opening in the side of said stocking having a zipper secured in said opening, said zipper having cloth edges of a soft stretchable material secured to said spandex at said opening by stitching, said opening extending upwardly, longitudinally of said stocking with the lower end of said opening commencing at approximately an inch below the interior malleolus of the ankle and the upper end spaced from the top of said stocking.

**4,166,464**

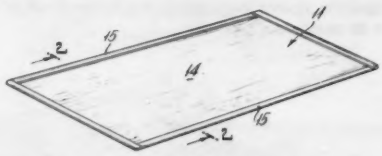
## ABSORBENT DRESSING

**Ralf Korpman, Bridgewater, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.**

**Continuation-in-part of Ser. No. 699,104, Jun. 23, 1976, abandoned. This application May 13, 1977, Ser. No. 796,794**

**Int. Cl.[2] A61F *17/18***

**U.S. Cl. 128—287** **23 Claims**



1. A highly flexible and conformable disposable absorbent dressing which comprises a layer of absorbent material, and a thin, flexible, elastic and easily stretchable thermoplastic backing film retained in superimposed relationship with said absorbent layer, said backing film possessing:

1. an elastic recovery from 50 percent stretch of at least about 75 percent, 2. a rubber modulus of not above about 2,000 pounds per square inch at 50 percent elongation, and 3. a Gurley stiffness at a thickness of 1 mil of not above about one.

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**4,166,465**

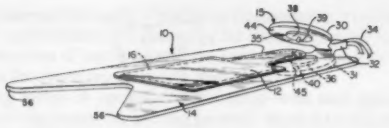
## ELECTROSURGICAL DISPERSIVE ELECTRODE

**Janet M. Esty, Boulder, and John A. Cox, Broomfield, both of Colo., assignors to Neomed Incorporated, Boulder, Colo.**

**Filed Oct. 17, 1977, Ser. No. 842,463**

**Int. Cl.[2] A61N *3/06***

**U.S. Cl. 128—303.13** **22 Claims**



1. A dispersive electrode adapted for use with electrosurgical equipment in establishing a capacitive coupling with the skin of a mammal comprising:

an insulated backing member;

a substrate in the form of a flexible electrically conductive layer having one surface applied to one surface of said backing member and a second surface adapted to be applied to the skin;

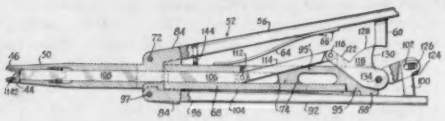
means for applying said second surface to the skin so as to define a direct capacitive interface between said second surface and the skin capable of safely dispersing current flow when used with electrosurgical equipment, said means for applying including a dielectric film applied directly to said second surface of said substrate and which when applied to the skin defines said capacitive interface between said second surface of said substrate and the skin; and

electrical connecting means for making electrical contact with said substrate.

## 4,166,466
## REPEATING HEMOSTATIC CLIP APPLYING INSTRUMENTS AND MULTI-CLIP CARTRIDGES THEREFOR

Robert K. Jarvik, 5974 Holladay Blvd., Salt Lake City, Utah 84121

Filed Oct. 8, 1976, Ser. No. 730,933
Int. Cl.[2] A61B *17/12*
U.S. Cl. 128—325 25 Claims



1. A hemostatic clip applying instrument adapted for use with a multi-clip cartridge having a plurality of clips therein comprising:

A. a pair of movable mating jaws towards the front of the instrument operatively connected together and adapted to be opened and closed by movement in a first plane,

a. each of said jaws having a groove along the inner mating surface thereof in said first plane, said grooves being aligned in the same plane and mating when closed;

B. a channel member integral with and extending from one of said jaws towards the rear of the instrument

a. having a hemostatic clip receiving three-sided channel therein of substantially the same thickness and width as the undeformed clips, said channel aligned with and extending from said grooves towards the rear of the instrument, and substantially completely open on the fourth wide side thereof,

b. said channel member having means for mounting a multi-clip cartridge thereto remote from said jaws; and

C. an elongated pusher of a width and thickness at its forward end no greater than said channel for pushing said clips, one at a time, from the cartridge through said channel into said grooves in said jaws;

D. a channel closing member integral with and extending from the other said jaws toward the rear of said instrument and mating with said open fourth side of said channel to substantially completely close the same such that said clips are closely guided on four sides as they pass through said channel.

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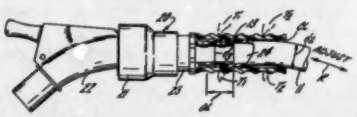
## 4,166,467
## BITE BLOCK FOR ENDOTRACHEAL TUBE

Harvey J. Abramson, New York, N.Y., assignor to Metatech Corporation, Northbrook, Ill.

Filed Aug. 8, 1977, Ser. No. 822,562
Int. Cl.[2] A61M *25/00*
U.S. Cl. 128—351 4 Claims



1. An endotracheal tube assembly comprising, in combination, a curved section of flexible tubing suitable for insertion into the trachea and having a junction fitting at its outer end, the junction fitting being made of hard plastic and substantially larger in diameter than the tubing and extending outside of the mouth of the patient, the junction fitting providing a male connection for the tubing adjacent the lips of the patient, the tubing having an interference fit in the region of overlap with the male connection so that the tubing is stretched and enlarged in the region of overlap, a bite block in the form of a ferrule of relatively soft resilient plastic telescoped over the tubing and extending from the region of overlap inwardly into the mouth of the patient, the bite block having an inner diameter greater than the diameter of the tubing for free sliding movement thereon while providing a snug frictional fit with the tubing at the enlargement in the region of overlap, the bite block having substantially parallel top and bottom surfaces for gripping by the teeth of the patient, the walls of the bite block being sufficiently thick so as to preclude collapsing of the tube upon clenching of the teeth.

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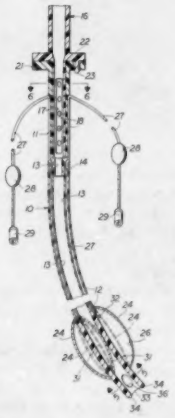
## 4,166,468
## APPARATUS FOR ENDOTRACHEAL AND ESOPHAGEAL INTUBATION

Louis D. Haynie, 215 Mulberry Pl., Birmingham, Ala. 35214

Filed Aug. 5, 1977, Ser. No. 822,136
Int. Cl.[2] A61M *25/00*
U.S. Cl. 128—351 2 Claims



1. Apparatus for endotracheal and esophageal intubation comprising:

(a) an elongated tubular member having a first portion with an open outer end and a second portion with an open inner end and a lumen extending between said outer and inner ends,

(b) a first inflatable member carried about the outer walls of said second portion of said tubular member in spaced relation to said inner end for inflation within a body canal to form a seal with the walls thereof,

(c) a second inflatable member mounted within said lumen of said tubular member for sealing said lumen when inflated,

(d) a plurality of discharge openings through the walls of said first portion of said tubular member between said outer end and said second inflatable member,

(e) a tubular insert of a size to telescope into said open outer end of said first portion of said tubular member with one end of said insert projecting outwardly of said open outer end of said first portion,

(f) at least one discharge opening through the walls of said insert in position to move into alignment and communication with said discharge openings in said first portion upon movement of said insert to one position and to move out of alignment and communication with said discharge openings in said first portion upon movement of said insert to another position,

(g) a laterally extending flange carried by said first portion of said tubular member adjacent the outer open end thereof,

(h) a laterally extending flange carried by said insert in position to extend alongside said flange carried by said first portion, and

(i) a projection carried by one laterally extending flange and

angularly spaced recesses in the other laterally extending flange with said projection being adapted to snap into a selected angularly spaced recess to retain said insert selectively in said one portion and said another position.

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**4,166,469**

## APPARATUS AND METHOD FOR INSERTING AN ELECTRODE

**Philip O. Littleford, 500 E. Rollins, Orlando, Fla. 32803**

**Filed Dec. 13, 1977, Ser. No. 860,246**
**Int. Cl.[2] A61N *1/18***
**U.S. Cl. 128—784** **13 Claims**

1. The method of inserting an electrode into an internal organ of a patient, comprising the steps of:
inserting a needle through the exterior skin of the patient to puncture the internal organ of the patient:
introducing a guide wire through the needle to enter the internal organ;
withdrawing the needle;
introducing an introducer and an introducer sleeve over the guide wire to communicate with the puncture in the internal organ of the patient; and
withdrawing the introducer and the guide wire;
introducing an electrode through the introducer sleeve to enter the organ of the patient; and
removing the introducer sleeve from the patient by peeling off the introducer sleeve from the electrode.

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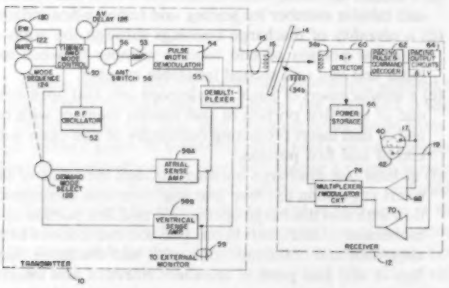
**4,166,470**

## EXTERNALLY CONTROLLED AND POWERED CARDIAC STIMULATING APPARATUS

**Robert A. Neumann, Blaine, Minn., assignor to Medtronic, Inc., Minneapolis, Minn.**

**Filed Oct. 17, 1977, Ser. No. 842,564**
**Int. Cl.[2] A61N *1/36***
**U.S. Cl. 128—419 PG** **5 Claims**



1. Cardiac stimulating apparatus for applying stimulating signals to the atria and ventricles of a patient's heart, said cardiac stimulating apparatus comprising:
a. a first unit disposed externally of the patient's body and including generator means for controlling the generation and transmission of a first power signal and a second control signal in the form of electromagnetic energy into the patient's body and disposed in a timed relation to the first power signal; and
b. a second unit adapted to be surgically implanted within the patient's body, said second unit including first means responsive to the transmitted first power signal for providing the sole energization of said second unit, and second means for respectively applying the first and second stimulating signals to the atria and ventricles of the patient's heart, said second means includes decoding means responsive to the transmitted second control signal for initiating the operation of and energizing of said second means and controlling the selective application of one of the first and second stimulating signals in accordance with the timed relation of the second control signal.

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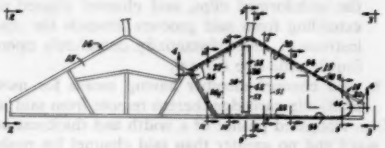
**4,166,471**

## PROSTHESIS PAD RETAINER MEANS FOR A BRASSIERE OR OTHER BREAST GARMENT

**John A. Griffin, and Ivon D. Griffin, both of 2769 Brouse St., Indianapolis, Ind. 46218**

**Filed Jul. 13, 1977, Ser. No. 815,296**
**Int. Cl.[2] A41C *3/10***
**U.S. Cl. 128—478** **7 Claims**



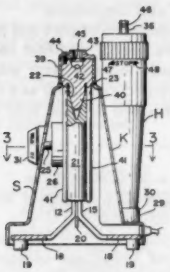
1. A brassiere or other garment for wearing about a female's breast area of her body, having an outer panel means of outwardly convex shape so as to overlie and receive therein the wearer's breast:
the garment having also an inner panel means of generally flat shape;
the inner panel means being secured along the top and bottom portions of the outer panel means, and also secured thereto along the inner or medial portion thereof;
the said securing being such as to not only retain the inner panel means and the outer panel means in assembled relationship but also to define or provide an enclosed pocket for retaining therein a prosthesis pad;
the inner panel means having a vertically-extending access opening generally centrally thereof, of a length as much as the height of the prosthesis pad,
the arrangement being such as to permit the prosthesis pad to be slipped through the said access opening into the said pocket provided by the outer panel means and inner panel means;
in a combination in which there is provided an unsecured portion of the inner panel means in the region of the outer portion of the outer panel means, providing an outer opening therebetween which provides the double function of (a) permitting a wrap-around portion of the prosthesis pad to extend therethrough during wearing of the garment, and (b) permitting the outer portion of the prosthesis pad to be moved sufficiently outwardly during its said insertion or subsequent removal from the pocket provided by the inner panel means and outer panel means so that the inner portion of the prosthesis pad will be sufficiently far enough outwardly to pass through the said generally central vertically-extending access opening.

4,166,472

## HAIR CURLER AND STAND

Anthony Battaglia, 455 NW. 202nd Ter., Miami, Fla. 33169

Filed Sep. 16, 1977, Ser. No. 833,824
Int. Cl.[2] A45D *1/00*
U.S. Cl. 132—9 2 Claims



1. A combined curling iron and stand comprising a tubular member forming a handle for said curling iron, a rotatable shaft extending outwardly of said tubular member, hair curling means having a base member mounted on said shaft and a plurality of substantially parallel prongs disposed symmetrically about in a circle mounted on said base member, means removably mounting said base member on said shaft and power means mounted in said tubular member for rotating said shaft and said hair curling means, said stand having a plurality of substantially cylindrical members for receiving said hair curling means, a heating element mounted between said cylindrical members, and a plate member for transferring heat from said heating element to said cylinders, said plate member having side walls and edge portions and engaging said cylindrical members at said side edge portions, and a wall member engaging said plate member on each side of said plate member and forming a chamber for said heating element.

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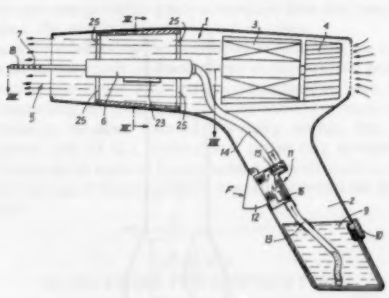
4,166,473

## METHOD AND APPARATUS FOR SETTING HAIR

Daniel Bauer, Le Raincy; Jules Leroy, Blanc Mesnil, and Jean-Paul Beck, Paris, all of France, assignors to L'Oreal, Paris, France

Filed Jun. 9, 1975, Ser. No. 584,980
Claims priority, application Luxembourg, Jun. 10, 1974, 70281
Int. Cl.[2] A45D *1/00*
U.S. Cl. 132—9 11 Claims



1. Process for setting hair which comprises the steps of subjecting at least partially dry hair wound on a tubular member to the action of dry steam at a temperature between 100° and 150° C. for a period of 1 to 60 seconds and then cooling said hair to the ambient temperature by directing a current of cooling gas thereagainst while still on said member, after which the hair is unwound from said member.

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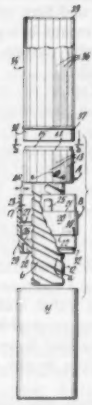
4,166,474

## COSMETIC CONTAINER CONSTRUCTION

James M. McArdle; Eric J. Idec, both of Cheshire, and Francis G. Marshall, Meriden, all of Conn., assignors to Eyelet Specialty Co., Inc., Wallingford, Conn.

Filed Mar. 8, 1977, Ser. No. 775,522
Int. Cl.[2] A45D *40/26*
U.S. Cl. 132—88.7 12 Claims



1. In a propel-repel cosmetic container wherein (a) an elongate tubular outer shell is characterized by polygonal wall formations along a major portion of its length and includes a rotary bearing portion at a longitudinal end thereof, (b) a carrier member is slidably positionable along said major extent and has corresponding polygonal faces in non-rotatable engagement with the inner surfaces of said wall formations, said carrier member being of single-piece injection-molded plastic construction and openly cupped at one end to receive and support cosmetic material in cantilevered projection beyond said one end, said carrier member integrally including at its other end an elongate tail having external thread formations, and (c) a cupped base-end closure in rotational and axially located engagement with said bearing portion and accommodating said tail when said carrier member is in its fully retracted position, said closure including a nut formation in threaded engagement with said thread formations, the improvement wherein said nut formation is part of a cupped nut member apart from but in permanently secured assembly to a cupped base member to complete said base-end closure, said nut member having a cup-member-engaged portion and the bore of the cup of said nut member having a bearing-portion-engaged portion and being of single-piece injection-molded plastic construction, whereby said carrier and nut members may constitute a two-piece basic subassembly of coacting propulsion parts having inherent universal application in combination with a variety of styles, shapes, materials and formations of said tubular outer shell and of said cupped base member to provide at relative economy a range of different products all of which utilize said carrier and nut members.

**4,166,475**

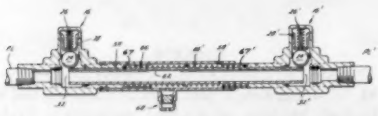
## SAFETY COUPLING

**John C. Gano, Carrollton, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.**

**Continuation of Ser. No. 778,046, Mar. 16, 1977, abandoned, which is a continuation of Ser. No. 612,901, Sep. 12, 1975, abandoned. This application May 31, 1978, Ser. No. 911,098**

**Int. Cl.[2] F16L *29/00***

**U.S. Cl. 137—68 R** **13 Claims**



1. A safety coupling for a conduit adapted to connect a first and second section of said conduit comprising:

a first valve means adapted for connection to said first section of said conduit, said first valve means having a fluid channel, said valve means being movable from open to closed position thereby closing flow through said first section of said conduit;

second valve means adapted for connection to said second section of said conduit, said second valve means having a fluid channel, said second valve means being movable from open to closed positions thereby closing flow through said second section of said conduit;

means for releasably connecting said first valve means to said second valve means so that said first and second valve means may separate on application of a predetermined longitudinal force on said conduit, said connecting means including a tubular housing extending between said first and second valve means and means for releasably securing said first and second valve means to said housing, said securing means being releasable upon application of a predetermined longitudinal force on said conduit so that at least one of said valve means may separate from said housing;

an elongate retaining sleeve associated and coacting with the connecting means extending from said first valve means through said housing to said second valve means for releasably retaining said first and second valve means in the open position while said first and second valve means are connected;

said first and second valve means each comprises a ball closure means and a valve seating means, said ball closure means being normally locked in the open position by said retaining sleeve, said closure means being retained laterally from said fluid channel;

means for positively moving the retaining sleeve to a position actuating both said first and second valve means to permit said first and second valve means to move to closed position upon movement of the first and second valve means apart a selected distance.

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**4,166,476**

## VACUUM CUT-OFF VALVE

**Minoru Yamanaka, Toyota, and Yasuhiro Kawabata, Anjo, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Aichi, Japan**

**Filed Aug. 8, 1977, Ser. No. 822,550**

**Claims priority, application Japan, Aug. 9, 1976, 51-95150**

**Int. Cl.[2] F02P *5/10***

**U.S. Cl. 137—103** **9 Claims**

1. A vacuum cut-off which comprises:

a body member member having an inlet port for connection to a vacuum source, an outlet port for connection to a vacuum utilization device, and an air port connected to a source of atmospheric pressure;

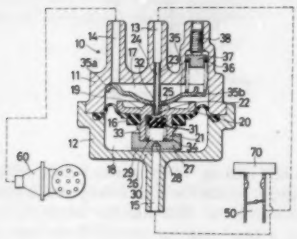
a flexible diaphragm for dividing the interior of said body member into a first chamber communicating with said outlet port and a second chamber communicating with said air port;

first valve means for controlling fluid communication between said inlet port and said first chamber by the movement of said diaphragm;

second valve means for controlling fluid communication between said first chamber and said second chamber by the movement of said diaphragm;

a pipe associated with said inlet port and provided with a tip end acting as a first seat of said first valve means;

a pressure plate made integral with said diaphragm and provided with a projection acting as a second seat of said second valve means and an axial hole within which said



pipe is coaxially disposed wherein said pressure plate is provided with a small air chamber continuously communicated to said second chamber through an orifice passageway formed in said air chamber; and

regulating means located in said first chamber and operatively connected to said diaphragm whereby said first valve is kept open while said second valve is kept closed before the inlet vacuum reaches a predetermined level, said diaphragm being movable due to the increase of the inlet vacuum whereby said first valve is closed when the inlet vacuum reaches the predetermined level, wherein said second valve is opened when vacuum in said second chamber increases above the predetermined level.

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**4,166,477**

## DISCHARGE CONDUITS OF STEAM GENERATORS AND THE LIKE

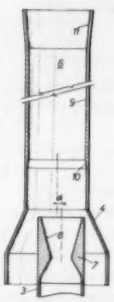
**Louis Duthion; Max Sagner, both of Paris, and Claude Portier, Le Chesnay, all of France, assignors to Bertin & Cie, Plaisir and Stein Industrie, Velizy-Villacoublay, both of, France**

**Filed Jun. 25, 1976, Ser. No. 699,871**

**Claims priority, application France, Jun. 26, 1975, 75 20074**

**Int. Cl.[2] F17D *1/02***

**U.S. Cl. 137—604** **3 Claims**



1. An exhausting device for pressure-relieving a high-pressure apparatus comprising in combination an exhaust conduit comprising a tubular downstream portion and a generally cylindrical shaped upstream portion which is of smaller diame-

ter than said tubular downstream portion, said conduit having a widened inner end in the form of a hood open to ambient, said generally cylindrical upstream portion being preceded by a convergent section connected to said hood, and being followed by a divergent section defining said tubular downstream position, a valve controlled discharge pipe having means for connecting said pipe to a high-pressure apparatus at one end with the other end positioned within said hood, a jet nozzle having a convergent-divergent configuration integral with said discharge pipe and forming a constricting outlet end for said pipe which projects into said hood while being inwardly spaced from the wall thereof, the convergent section of said jet nozzle being connected to said pipe and the divergent section opening into said exhaust conduit.

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**4,166,478**

## ACCUMULATOR HAVING A BLADDER TO BE FILLED WITH LIQUID

**Nobuyuki Sugimura, and Kazuo Sugimura, both of 308, Mabase, Shimizu-shi, Shizuoka-ken, Japan**

**Filed Dec. 21, 1977, Ser. No. 862,863**
**Int. Cl.[2] F16L *55/04***
**U.S. Cl. 138—30** **10 Claims**

1. In a hydropneumatic accumulator of the type wherein an elongated elastically resilient inverted bag-like bladder having a mouth at its bottom on the longitudinal axis of the bladder is located in an elongated rigid-walled upright vessel also having a mouth at its bottom coaxially of the bladder mouth, to divide the interior of the vessel into inner and outer compartments, wherein the mouths of the bladder and of the vessel are sealed to one another and thus provide an inlet into the bladder for a relatively incompressible hydraulic medium, and wherein an inlet in a wall of the vessel provides for the introduction of a pressurized compressible gaseous medium into the outer compartment, the improvement which comprises:

means for minimizing the likelihood of failure of the bladder wall as the result of fluctuations in the relative pressures within the inner and outer compartments, said means comprising an inverted solid substantially conical shape-defining member located coaxially within the upper closed end of the bladder and projecting downwardly therefrom to support the adjacent side wall portions of the bladder upon flexure thereof inwardly toward the bladder axis.

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**4,166,479**

## BLIND LINER FOR SERVICE PIPES

**Thomas H. Cleavenger, Chicago, Ill., assignor to Cleavenger Associates, Inc., Chicago, Ill.**

**Continuation-in-part of Ser. No. 794,962, May 9, 1977, abandoned. This application Jun. 12, 1978, Ser. No. 914,604**
**Int. Cl.[2] F16L *55/18***
**U.S. Cl. 138—97** **4 Claims**

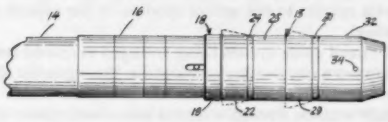
1. A fitting for a blind liner assembly for service pipes, with the fitting having fixed attachment to one end of the liner wherein the improvement comprises:

(a) a hollow adapter having an externally threaded boss extending axially from one side thereof and of a diameter less than said adapter,

(b) an annular shoulder extending between the different diameters of said adapter and said boss and facing away from said boss,

(c) a first sealing gasket mounted on said adapter adjacent to said shoulder,

(d) a hollow compression head having one end of a diameter equal to said adapter and internally threaded so as to be threaded upon said boss against said gasket so as to radially expand the same about said shoulder,



(e) said compression head having its opposite end provided with an externally threaded boss of a diameter equal to said threaded boss provided by said adapter,

(f) said compression head providing a second annular shoulder extending between the different diameters of its ends,

(g) a second sealing gasket mounted on said annular shoulder provided by said compression head, and

(h) a compression nut internally threaded so as to be threaded upon said threaded boss of said compression head against said second sealing gasket so as to radially expand the same about said shoulder provided by said compression head.

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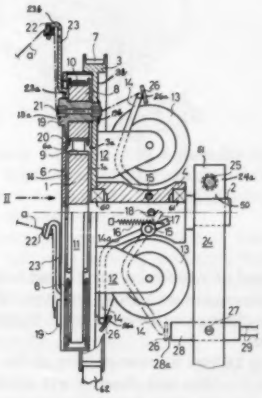
**4,166,480**

## APPARATUS FOR FORMING LENO SELVEDGES IN WEAVING MACHINES

**Walter Müller, Tann-Rüti, Switzerland, assignor to Rüti Machinery Works Limited, Rüti, Switzerland**

**Filed Apr. 28, 1978, Ser. No. 901,252**
**Claims priority, application Switzerland, May 13, 1977, 5995/77**
**Int. Cl.[2] D03C *11/00*; D03D *47/40***
**U.S. Cl. 139—54** **8 Claims**



1. An apparatus for forming leno selvedges in weaving machines, comprising:

a stationary sun wheel having an axis;

two diametrically arranged planet wheels cooperating with said sun wheel;

each of said diametrically arranged planet wheels having an axis of rotation;
means for operatively coacting said two planet wheels with said sun wheel;
means supporting said planet wheels to be rotatable about their own axis in a direction opposite to their direction of rotation about the axis of the sun wheel;
means for driving said planet wheels about the axis of the sun wheel and about their own respective axis of rotation;
the transmission ratio between the sun wheel and the planet wheels amounting to 2:1;
a bobbin holder for a thread bobbin provided for each planet wheel;
a thread guide eyelet supported by each planet wheel;
each said thread guide eyelet being arranged eccentrically with respect to the axis of rotation of the related planet wheel;
said thread guide eyelets being arranged in spaced relationship from one another and when at their greatest spacing from one another being situated in a plane which essentially extends through a central axis of said planet wheels; and
said bobbin holders being fixedly arranged on a part of said supporting means for said planet wheels.

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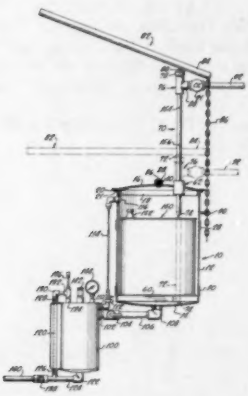
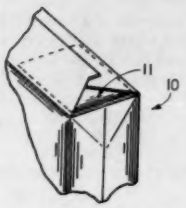
**4,166,481**
**CLOSED LIQUID TRANSFER SYSTEM**
**Darrel D. Farris, 4766 Pixie Ave., Lakewood, Calif. 90712, and Dan Riggi, P.O. Box 997, Blythe, Calif. 92225**
**Filed May 30, 1978, Ser. No. 910,485**
**Int. Cl.[2] B65B *3/04***
**U.S. Cl. 141—1** **12 Claims**



9. A method of transferring toxic liquid without exposure to ambient environment comprising the steps of
placing a closing container of toxic liquid within a sealed chamber,
puncturing at least a lower portion of the closed container while it is within said chamber and while said chamber is sealed, whereby toxic liquid from said container will flow into said chamber,
flowing liquid from said chamber to a closed tank while said chamber is sealed, and
flowing fluid from said tank to said chamber as liquid flows from said chamber to said tank.

**4,166,482**
**LUBRICATED VALVE BAG AND METHOD OF LUBRICATING VALVE SPOUT**
**James R. Sanders, Savannah, Ga., assignor to Union Camp Corporation, Wayne, N.J.**
**Filed Jun. 19, 1978, Ser. No. 916,468**
**Int. Cl.[2] B65B *3/00*; B67C *3/30***
**U.S. Cl. 141—1** **11 Claims**




7. The method of lubricating the valve spout used for filling valve bags by inserting such spout into a valve opening having a valve insert secured within the said opening at one corner of each said bag comprising
applying a thin coating of a lubricant to the inner surface of the valve insert of a first valve bag;
inserting the valve spout into the valve opening of the said first valve bag to bring the spout into contact with the lubricant on the valve insert;
whereby some of the lubricant will be transferred to the outer surface of the valve spout and facilitate slipping succeeding bags onto the spout.

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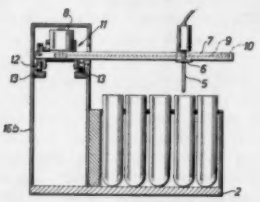
**4,166,483**
**PROGRAMMABLE FRACTION COLLECTOR**
**Lage A. Nordlund, Uppsala, Sweden, assignor to Pharmacia Fine Chemicals, Sweden**
**Filed Dec. 1, 1977, Ser. No. 856,386**
**Claims priority, application Sweden, Dec. 14, 1976, 7614077**
**Int. Cl.[2] B65B *3/04***
**U.S. Cl. 141—1** **16 Claims**



1. A method of controlling the movement of a drop discharge device for dispensing fluid in a fraction collector wherein the drop discharge device is moved across plural test containers disposed in an array of two or more rows, the center to center distances between adjacent test containers in a row being the same, the center to center distances between adjacent test containers in at least one of said rows being different from the center to center distances between adjacent test containers in at least another of said rows, comprising:
storing in a memory information representative of plural preselected basic patterns of coordinate positions corresponding to the locations of each of said test containers in said array,
storing in said memory for each basic pattern of coordinate positions plural preselected sub-patterns of coordinate positions corresponding to the locations of test containers at which fluid is to be introduced into a container by said drop discharge device,
selecting one or more of said stored basic patterns of coordi-

nate positions and at least one of said sub-patterns of coordinate positions associated therewith,

storing in a memory information representative of the number of drops of fluid to be dispensed by said drop discharge device at each of said coordinate positions in said selected subpatterns,

automatically moving the drop discharge device in discrete steps across and between said rows of test containers,

counting the number of discrete steps of movement of the drop discharge device across and between said rows,

stopping the drop discharge device when the counted number of discrete steps corresponds to a coordinate position in a sub-pattern selected from memory.

causing said drop discharge device to dispense fluid while said device is stopped, and

automatically resuming movement of the drop discharge device in discrete steps when said predetermined number of drops indicated by said stored information has been counted.

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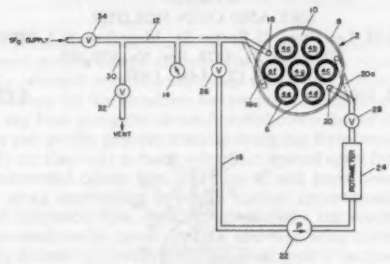
**4,166,484**

## METHOD AND APPARATUS FOR MIXING GASES IN A CLOSED CHAMBER

**Thomas F. Reed, Akron, Ohio, assignor to The General Tire & Rubber Company, Akron, Ohio**

**Filed Jan. 20, 1978, Ser. No. 871,065**
**Int. Cl.[2] B65B *31/02***
**U.S. Cl. 141—4** **14 Claims**



1. A method of rapidly distributing a first gas throughout a chamber that contains a mixture of said first gas and a second gas and is sealed from the atmosphere, said chamber being defined by the sections of a mold for joining together ball halves and by a plurality of said ball halves lodged in cavities in said mold sections, and said mold sections having been closed to a position in which the edges of said ball halves are near to but not engaging each other and in which the outer peripheries of said mold sections are in sealing engagement with one another, comprising the steps of withdrawing said mixture of gases through a first port in said chamber and pumping said mixture of gases into said chamber through a second port distant from said first port to cause a flow of said mixture throughout said chamber, said withdrawal and pumping being continued until said first gas is distributed to the desired degree of uniformity throughout said chamber.

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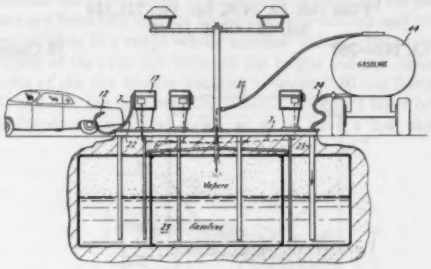
**4,166,485**

## GASOLINE VAPOR EMISSION CONTROL

**Albert L. Wokas, 22245 Thorofare, Grosse Ile, Mich. 48138**

**Continuation of Ser. No. 351,767, Apr. 16, 1973, abandoned. This application Jul. 12, 1976, Ser. No. 704,197**
**Int. Cl.[2] B65B *57/06;* B67C *3/26***
**U.S. Cl. 141—52** **18 Claims**

1. In a gasoline vapor emission control system for use with a motor vehicle having a gasoline tank with a fill tube having an opening, a gasoline dispenser, a gasoline dispensing nozzle having a spout to enter said fill tube, a gasoline vapor passage tube means of fixed length and of smaller cross sectional area than said spout mounted on the spout and extending over a major part of the length thereof and having an inlet opening located inside the fill tube and an outlet opening located out-



side the fill tube and adjacent a vapor receiving receptacle when the spout is inserted in the fill tube, a gasoline delivery hose connecting said nozzle to said dispenser, and vacuum type vapor flow assist means connected to said tube means.

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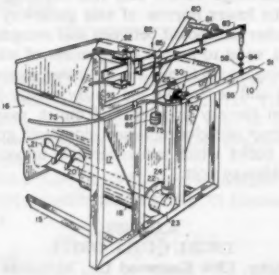
**4,166,486**

## NOZZLE FOR AN APPARATUS FOR DENATURING FOOD PRODUCTS

**Robert L. Soran, Modesto, Calif., assignor to Beatrice Foods Co., Modesto, Calif.**

**Filed Jan. 10, 1978, Ser. No. 868,388**
**Int. Cl.[2] B65B *1/04;* B67C *3/02***
**U.S. Cl. 141—105** **5 Claims**



1. In an apparatus for denaturing a flowable comminuted meat material by injecting an agent into a stream of the material so as to form a streak of the agent longitudinally of the stream, the improvement comprising:

A. A nozzle through which the stream of material flows along a flow axis prior to being discharged from the nozzle, the nozzle having a tubular body extending about the flow axis and having internal surfaces substantially parallel to said flow axis and extending from an inlet end portion to an opposite outlet end portion;

B. a plurality of vanes borne by and spaced substantially equidistant about said internal surfaces in radial relation to and spaced from the flow axis and extending more than half way between the inlet and outlet end portions; and

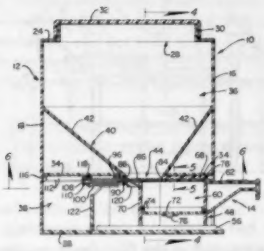
C. a tubular duct substantially concentric to the flow axis extending to an open discharge end through which the agent is injected and which is inwardly adjacent to the outlet end portion of the nozzle.

**4,166,487**

## DISPENSING AND MEASURING DEVICE

Henry J. Spies, Princeville at Hanalei, P.O. Box 206, Hanalei, Kauai, Hi. 96714

Filed Oct. 12, 1976, Ser. No. 731,349
Int. Cl.[2] G01F *11/10*
U.S. Cl. 141—358 15 Claims



1. A dispensing and measuring device comprising a container having a discharge outlet therein, a guideway port extending beneath said outlet, closing means adapted for sliding movement within said guideway port along a path immediately beneath said outlet for closing said outlet, the portion of said closing means disposed forwardly of said outlet when said closing means is in its closed position having a plurality of perforations therein, guide means for supporting and slidably guiding said closing means along said path immediately beneath said outlet, bias means for moving said closing means to and normally retaining said closing means in a closed position beneath said outlet, a measuring receptacle adapted for insertion into and slidable movement within said guideway port along a path immediately below said closing means, a plurality of longitudinal ribs extending upwardly from a lower portion of said guideway port and configured to maintain an upper edge of said measuring receptacle in closely spaced relation below said discharge outlet, said ribs defining longitudinal channels in the lower portion of said guideway port, and a shoulder member interposed between said receptacle and said closing means, so as to permit engagement of said receptacle with said closing means to move said closing means away from said outlet as said receptacle moves forwardly through said guideway port thereby opening said outlet, said bias means tending to retract said closing means along said guideway port to close said outlet when said receptacle moves rearwardly along said guideway port.

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**4,166,488**

## TWIRL QUILL DRILL

Holcomb B. Irby, 1304 Kentwood Dr., Mountain Home, Ark. 73653

Filed May 23, 1977, Ser. No. 799,541
Int. Cl.[2] B25G *1/12*
U.S. Cl. 145—61 G 17 Claims

1. A hand-held mechanism for holding and hand rotating a rotatable tool comprising

a hollow handle, and

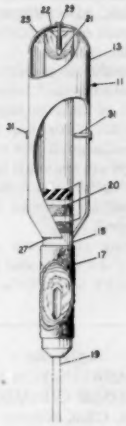
a tool-holding quill having a forward end and a back end placeable in and removable from said handle and including means in said forward end for holding a rotatable tool,

said quill having a size and shape relative to the hollow of said handle causing a rotatable relationship between said quill and said handle,

said hollow handle including at least one lateral bearing element cooperating with said quill to restrain it against lateral movement while permitting rotation thereof,

said quill when in place in said handle being of sufficient length relative to the hollow of said handle to provide a gripping section of said quill between the forward end of said handle and the forward end of said quill,

whereby said mechanism may be held in one hand by the third, fourth or fifth fingers, and the quill may be hand-



rotated by the thumb and forefinger of the same hand with a twirling action.

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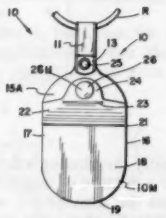
**4,166,489**

## KEY AND COIN HOLDER

Jerome H. Lemelson, 85 Rector St., Metuchen, N.J. 08840

Filed Feb. 21, 1978, Ser. No. 879,393
Int. Cl.[2] A45C *1/00*
U.S. Cl. 150—35 5 Claims



1. A key holding device and container for coins and the like comprising:

a unitary plastic molding formed with a container portion for containing coins and the like and defining coin retaining means having front and rear wall portions and manually operable means for permitting the release of coins therefrom,

said rear wall portion of said container having a flat portion molded integral therewith which flat portion extends outwardly beyond the container portion of said molding,

a thin, flexible strip-like portion integrally molded to said outwardly extending flat portion of said rear wall portion of said container portion and formed in a loop with the end portion of said strip-like portion secured to said flat portion extending outwardly beyond the container portion of said molding so as to close and retain the loop closed,

a ring held within said loop and containing one or more keys thereon,

said container portion having a closure formed of the unitary molding,

a hinge portion molded between said closure and said container portion for movably retaining the closure assembled with the container portion, and

means for frictionally retaining said closure in a closed position against said container portion to retain objects held within the container portion.

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**4,166,490**

## PNEUMATIC RADIAL TIRE

**Dionysius J. Poque', Aachen, Fed. Rep. of Germany, assignor to Uniroyal GmbH, Aachen, Fed. Rep. of Germany**

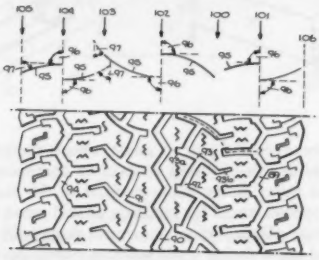
**Filed May 24, 1977, Ser. No. 800,136**

**Claims priority, application Fed. Rep. of Germany, Nov. 30, 1976, 3156; Dec. 23, 1976, 3159; Mar. 11, 1977, 2710825**

**The portion of the term of this patent subsequent to Jan. 23, 1993, has been disclaimed.**

**Int. Cl.² B60C *11/06***

**U.S. Cl. 152—209 R** **8 Claims**



1. A pneumatic radial tire having carcass and tread portions, said tread portion comprising a profile pattern with circumferentially oriented rows of profile lugs which are defined laterally between the tire shoulders by one profile groove oriented in zig-zag form along the circumferential center line of the tire and by two profile grooves oriented in zig-zag form circumferentially continuously on each side of and spaced apart from the circumferential center line, said lugs of said rows being oriented along intersecting convexly curved approximately V-shaped reference lines running substantially transversely to said circumferential center line and said lugs being circumferentially defined by convexly curved cross groove sections, the tips of said reference lines pointing in opposite directions on either side of said circumferential center line.

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**4,166,491**

## RADIAL PNEUMATIC TIRES HAVING REINFORCED SIDEWALLS

**Mario Mezzanotte, Milan, Italy, assignor to Industrie Pirelli, S.p.A., Milan, Italy**

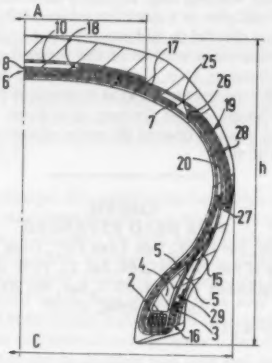
**Filed Apr. 4, 1977, Ser. No. 784,468**

**Claims priority, application Italy, Apr. 6, 1976, 21953 A/76**

**Int. Cl.² B60C *9/02***

**U.S. Cl. 152—354 R** **4 Claims**

1. In a pneumatic tire for vehicle wheels comprising a radial carcass constituted at least by one layer of cords lying on substantially radial planes, a tread and a breaker arranged between the carcass and the tread and comprising at least two superimposed cord layers, said cords being inclined at an angle between 10° and 35° with respect to the equatorial plane of the tire and being parallel to one another in any layer and crossing those of the adjacent layer, said breaker comprising further, in a radially outer position with respect to said layers, at least a strip of cords of textile material which shrinks in length with increase in temperature, said cords being arranged in a position parallel to the equatorial plane of the tire, and in each tire sidewall, a reinforcement of at least one cord layer arranged in an axially outer position to the carcass, the radially innermost edge of said reinforcing layer being disposed substantially adjacent to the bead core of the relative sidewall and axially outer to the turned up portion of the carcass wound about said bead core and a radially outer stretch of said reinforcing layer being disposed in said breaker between said two superimposed cord layers and said cord strip having the cords arranged in a position parallel to the equatorial plane of the tire, each cord of the reinforcing layer being inclined with respect to the circumferential line of the tire at an angle decreasing along the path of the cord from said radially innermost edge toward said stretch and variable in a range whose extreme values, chosen on the ground of the ratio h/c between the height and the maximum width of the tire section (ranging between 0.30 and 0.80), are 55° and 15°, the improvement wherein said cord layer of said reinforcement is folded twice, so as to have a first skirting



extending substantially from said radially innermost edge to a first folded edge arranged at the tire shoulder, a second skirting superimposed on the former and extending from said first folded edge to a second folded edge radially innermost to the former, and a third skirting superimposed on the other two and extending from said second folded edge to a position radially outermost to the latter in order to be disposed in said breaker between said two superimposed cord layers and said cord strip having the cords arranged in a position parallel to the equatorial plane of the tire.

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**4,166,492**

## METHOD OF PRODUCING AN ANNULAR BEAD CORE ASSEMBLY FOR A PNEUMATIC TIRE

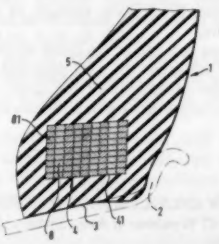
**Herbert Pfeiffer, Hemer-Westig, Fed. Rep. of Germany, assignor to Otto Kuhlmann GmbH & Co., Hemer-Westig, Fed. Rep. of Germany**

**Filed Nov. 23, 1977, Ser. No. 854,094**

**Claims priority, application Fed. Rep. of Germany, Nov. 25, 1976, 2653553**

**Int. Cl.² B29H *17/32***

**U.S. Cl. 152—362 R** **2 Claims**



1. In a method of producing an annular bead core assembly for a pneumatic tire including a bead region having a seating surface suitable for seating on a beveled shoulder wheel rim, wherein the bead core assembly has a substantially parallelogram-shaped cross-section and a radially inner surface which,

when incorporated in said tire, is inclined relative to the axial direction of the tire and extends parallel to the seating surface of said bead region, and wherein the bead core assembly comprises a plurality of wires having a substantially rectangular cross-section arranged in a plurality of juxtaposed substantially axially extending plies of the type including the step of winding the plies tightly one upon another upon a tapered support so as to produce a bead core assembly having an inclined radially inner surface which is oriented so as to extend parallel to the seating surface of the bead region of the tire into which the assembly is to be incorporated, the improvement comprising:

prior to said winding step, arcuately deforming the wires of each of said plies in a direction substantially perpendicular to a plane parallel to said annular bead core assembly and toward the inner surface of the finished pneumatic tire, said deforming step yielding wires having an arcuate shape of constant radius so as to produce plies having the general shape of the frustum of a cone, with the plies radius increasing toward the outer surface of the finished pneumatic tire.

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**4,166,493**

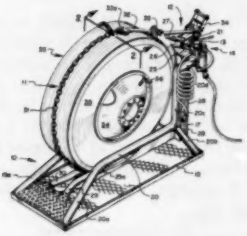
## TIRE BEAD EXPANDER

**Don B. Bosen, 166 Q St., Salt Lake City, Utah 84103**

**Continuation of Ser. No. 707,354, Jul. 21, 1976, abandoned. This application Dec. 21, 1977, Ser. No. 862,742**

**Int. Cl.[2] B60C *25/12***

**U.S. Cl. 157—1.21** **5 Claims**



1. A tire bead expander comprising a stand;

guide means on the stand including spaced apart side members between which a wheel assembly comprising a wheel having a tire mounted thereon is rolled and held in a vertical position, said guide means further including a central tire support with side edges on which the tire is adapted to be supported and a space therebetween extending from a ramp portion at a front of the stand rearwardly and upwardly in arcuate configuration to receive the wheel assembly;

a flexible draw strap partially positioned in the space between the side edges on which the tire is adapted to be supported and being long enough to peripherally surround the tire;

means to anchor one end of the draw strap to the stand; and

means closely adjacent the said one end of the strap for taking up the other end of the draw strap to thereby substantially uniformly tighten the draw strap around the tire.

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**4,166,494**

## MOVABLE CURTAIN PARTITION

**Peter R. Utting, 47 Wentworth Ave., Sydney, New South Wales, Australia (2000)**

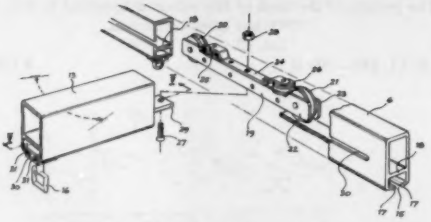
**Filed Nov. 18, 1977, Ser. No. 852,936**

**Claims priority, application Australia, Dec. 7, 1976, PC 8391**

**Int. Cl.[2] A47H *1/00***

**U.S. Cl. 160—330** **5 Claims**

1. A movable curtain partition extending between and normal to spaced apart substantially parallel first and second tracks, each track having thereon a horizontal upper facing guide surface and a pair of spaced vertical guide surfaces, said partition having a mono track, a curtain suspended vertically down therefrom, and a bogie-type support at each end of said mono track which corresponds to a different one of said first and second tracks, each support including opposite sides and at least one horizontal and one vertical rotatable guide wheel, arranged in a pair, at each end thereof, each horizontal guide wheel extending horizontally beyond the opposite sides of the corresponding bogie-type supports, linking means to connect said mono track with each of the bogie-type supports about



halfway between the pair of guide wheels thereof, and said vertical guide wheels being adapted to continuously engage horizontal upper facing guide surfaces of the corresponding first and second tracks for guidance of said mono track along a horizontal plane during movement along said tracks, the horizontal upper facing guide surfaces permitting the vertical wheels to move from side to side, and said horizontal guide wheels being adapted to engage both vertical guide surfaces of the corresponding first and second tracks so as to stop the side movement and prevent the opposite sides of the bogie-type supports from engaging the tracks.

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**4,166,495**

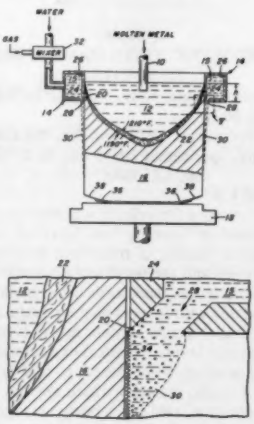
## INGOT CASTING METHOD

**Ho Yu, Murrysville, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.**

**Filed Mar. 13, 1978, Ser. No. 885,950**

**Int. Cl.[2] B22D *11/00, 11/124***

**U.S. Cl. 164—89** **49 Claims**




1. In a method for continuously casting light metal ingots wherein molten metal is continuously supplied to an open-ended mold, wherefrom an ingot is continuously withdrawn, wherein liquid coolant is directed to the surface of the ingot emerging from the mold to extract heat therefrom, and wherein casting is initiated by withdrawing from the mold a

starting block initially closing the mold, wherein the improvement comprises:

at the initial stage of casting, mixing a gas with the liquid coolant before direction of the liquid coolant to the ingot and directing said liquid coolant carrying said gas in a substantially continuous liquid phase to an initial portion of ingot length as it emerges from said mold thereby to extract heat at a retarded rate from said initial portion of ingot length, and, thereafter, reducing the amount of gas mixed with said liquid coolant directed to said ingot emerging from said mold to provide for an increased rate of heat extraction by said liquid coolant for subsequent portions of emerging ingot length.

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**4,166,496**

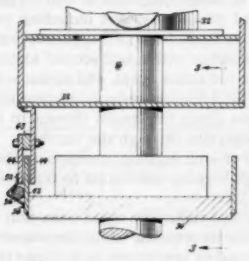
## STATIC SEAL

**Richard F. Stockman, Friendship, N.Y., assignor to The Air Preheater Company, Inc., Wellsville, N.Y.**

**Filed Aug. 21, 1978, Ser. No. 934,752**

**Int. Cl.² F28D** *19/00*

**U.S. Cl. 165—9** **5 Claims**



1. Rotary regenerative heat exchange apparatus including a cylindrical rotor containing a mass of heat absorbent material disposed for rotation about a central rotor post, a housing surrounding the rotor including connecting plates at opposite ends of the rotor having passageways that direct the flow of a low pressure heating fluid and the flow of a high pressure cooling fluid through the heat absorbent material carried by the rotor, bearing means adapted to support the rotor for rotation about its axis, sector plates intermediate an end of the rotor and the connecting plates of the rotor housing adapted to separate the low pressure fluid from the high pressure fluid, a first radial sealing means at the end of the rotor adapted to run against the sector plates to preclude the flow of fluid therebetween, a second radial sealing means extending radially between the connecting plate and the sector plate including a first elongate strip connected to a radially disposed edge of the connecting plate, a second elongate strip connected to the connecting plate adapted to lie spaced from the first elongate strip to provide an elongate gap therebetween, an elongate sealing member connected to a radially disposed edge of the sector plate and arranged to extend into the elongate gap between the first and second elongate strips to form a telescopic seal, and an elongate leaf spring arranged to bridge the space between relatively movable members.

**4,166,497**

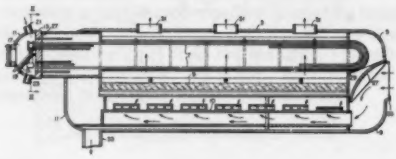
## APPARATUS FOR INCREASING EFFECTIVE SCAVENGING VENT STEAM WITHIN A HEAT EXCHANGER WHICH CONDENSES VAPOR INSIDE LONG TUBES

**Roland L. Coit, Swarthmore, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Continuation of Ser. No. 650,836, Jan. 21, 1976, abandoned. This application Aug. 25, 1977, Ser. No. 827,765**

**Int. Cl.² F28F** *13/04;* **F28B** *9/08*

**U.S. Cl. 165—111** **6 Claims**



1. A heat exchanger for transferring heat from a first fluid, which changes state from a vapor to a liquid, to a second fluid, which increases in temperature, said heat exchanger comprising a shell, a tube sheet having a plurality of holes, a head cooperatively associated with said shell and tube sheet, a plurality of U-shaped tubes having their inlet and outlet ends disposed in said holes in said tube sheet, a dividing plate disposed in said head so as to produce a first chamber and a second chamber and to separate said inlet and outlet ends of all of said tubes, said second chamber being unobstructed allowing the fluid to flow freely therethrough, an inlet nozzle for said first fluid in fluid communication with said first chamber of said head, a manifold disposed within the first chamber of said head, said manifold being so disposed in fluid communication with a plurality of said tubes and to cooperate with said second chamber to cause said first fluid to make four passes through said second fluid, and in such a manner that the first two passes produce a countercurrent cross flow relationship and the last two passes produce a concurrent cross flow relationship with a general up flow in the bends of the U-shaped tubes of said last two passes, said second chamber of said head having a liquid drain nozzle disposed therein and said second chamber being disposed to form a large plenum chamber between said second and third passes, whereby liquid is separated from the first fluid prior to the first fluid entering said third pass, and a vent line in fluid communication with said manifold, said vent line being disposed to vent vapor from said manifold.

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**4,166,498**

## VAPOR-CONDENSING, HEAT-TRANSFER WALL

**Kunio Fujie, Tokyo; Wataru Nakayama, Kashiwa; Takahiro Daikoku, Ibaraki; Shigeki Hirasawa, Noda, and Kimio Kakizaki, Hitachi, all of Japan, assignors to Hitachi, Ltd. and Hitachi Cable, Ltd., both of, Japan**

**Filed Jul. 12, 1977, Ser. No. 815,028**

**Claims priority, application Japan, Jul. 13, 1976, 51-82575**

**Int. Cl.² F28B** *9/08;* **F28F** *3/04, 13/18*

**U.S. Cl. 165—133** **3 Claims**

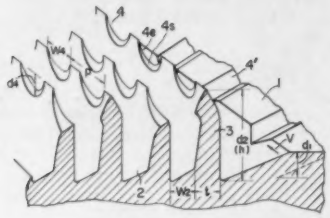
1. A vapor-condensing, heat transfer wall which liquefies vapor of a higher temperature than said wall by bringing the vapor into contact with said wall, comprising:

a plurality of parallel grooves provided in the basic surface of said wall;

a plurality of parallel ridge portions defined by said grooves thereamong, said portions having tip portions tapered in an acute angle and said portions extending perpendicularly to the basic surface of said wall; and

recessed portions provided in the tip portions of said ridge portions, the bottom surfaces of said recessed portions being inclined to said basic surface, and the edge surfaces of said recessed portions being tapered at a sharp angle;

the width of said grooves being 0.05 to 2.5 mm., the thickness of said ridge portions being 0.01 to 2.5 mm, the height thereof being not more than 10 mm; the depth of said recessed portions being 0.02 to 0.8 times the depth of said grooves, said depth of said recessed portions being measured from the tip of said ridge portions, the pitch of said recessed portions not more than 2.0 mm, said pitch being



measured in the longitudinal direction of said ridge portions, and the width of said recessed portions provided in the tip portion of said ridge portions in the longitudinal direction of the ridge portions being 0.01 to 1.0 times the pitch of said recessed portions; the recessed portions each extending at an angle of about 45°, in a crossing direction, with respect to the orientation of said ridge portions.

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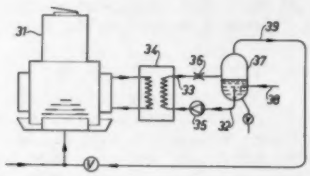
**4,166,499**

## METHOD AND AN APPARATUS FOR PREVENTING DEPOSITS IN A PROCESS WATER SYSTEM FOR A GAS GENERATOR PLANT OR THE LIKE

**Hans E. Sundqvist, Motala, Sweden, assignor to AB Motala Verkstad, Motala, Sweden**

**Filed Oct. 5, 1977, Ser. No. 839,656**
**Int. Cl.² B03C 3/00**
**U.S. Cl. 165—134 R** **5 Claims**



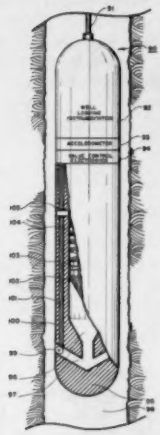
1. An improved gas generator plant having a gas generator, means for cleaning the gas produced in the generator, said means separating water and water soluble organic compounds from the gas during said cleaning, means for evaporating at least a portion of said water to form water vapor carrying at least a portion of said water soluble organic compounds, and means for supplying the water vapor and the water soluble organic compounds carried thereby to the gas generator, said evaporation means including a heat exchanger for heating said water to a temperature which at a predetermined pressure enables vapor formation and thereby boiling, conduit means for supplying the water and the water soluble organic compounds to and from the heat exchanger, and at least one pressure controlling means in said conduit means for preventing boiling of the water and thereby precipitation of the water soluble organic compounds in the heat exchanger.

**4,166,500**

## WELL LOGGING METHOD AND APPARATUS USING FRICTION-REDUCING AGENTS

**William A. McPhee, Houston, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.**

**Filed Oct. 3, 1977, Ser. No. 839,136**
**Int. Cl.² E21B 47/00, 47/12**
**U.S. Cl. 166—250** **8 Claims**



1. An apparatus for logging an earth borehole, comprising an elongated well logging instrument comprised of two sections, the first of said sections comprised of well logging instrumentation, the second of said sections including means to port a friction-reduction agent from said apparatus into said borehole comprising a chamber within said second section for maintaining said friction-reduction agent, and means within said chamber for forcing said friction-reduction agent into the borehole at various points along the length thereof to facilitate movement of said apparatus through the borehole.

7. A method of well logging, comprising the steps of:

causing a well logging instrument to traverse an earth borehole; and

porting a friction-reduction agent from said instrument into said borehole in response to the decreased acceleration of said well logging instrument to facilitate the movement of said instrument through said borehole.

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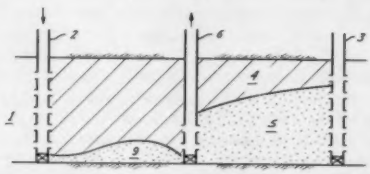
**4,166,501**

## HIGH VERTICAL CONFORMANCE STEAM DRIVE OIL RECOVERY METHOD

**Ralph J. Korstad, Austin; Wilbur L. Hall, Bellaire, both of Tex.; Ching H. Wu, Golden, Colo., and Alfred Brown, Houston, Tex., assignors to Texaco Inc., White Plains, N.Y.**

**Filed Aug. 24, 1978, Ser. No. 936,439**
**Int. Cl.² E21B 43/24**
**U.S. Cl. 166—263** **16 Claims**



1. A method of recovering viscous petroleum from a subterranean, viscous petroleum-containing formation, said forma-

tion being penetrated by at least two wells, one injection well and one production well, both of said injection and production wells being in fluid communication with a substantial portion of the formation, said injection and production wells defining a recovery zone within the formation, comprising:

(a) penetrating the formation with at least one infill well located within the recovery zone and in fluid communication with no more than the lower 50 percent of the formation;

(b) injecting a thermal oil recovery fluid comprising steam into the injection well and recovering fluid including petroleum from the formation by the production well until the fluid being recovered from the production well comprises a predetermined amount of steam or water;

(c) thereafter recovering fluids including petroleum from the formation by the infill well until the fluid being recovered comprises a predetermined fraction of steam or water while continuing injecting said thermal oil recovery fluid into the injection well; and thereafter

(d) injecting steam into the infill well and recovering fluids from the formation via the production well until the fluids being recovered comprise at least 80 percent water, and injecting an aqueous fluid into the injection well at a rate at least sufficient to maintain a positive pressure gradient between the injection well to the infill well.

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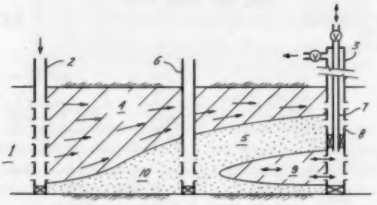
**4,166,502**

## HIGH VERTICAL CONFORMANCE STEAM DRIVE OIL RECOVERY METHOD

**Wilbur L. Hall, Bellaire; Alfred Brown, Houston, and Ralph J. Korstad, Austin, all of Tex., assignors to Texaco Inc., White Plains, N.Y.**

**Filed Aug. 24, 1978, Ser. No. 936,558**
**Int. Cl.[2] E21B *43/24***
**U.S. Cl. 166—263** **20 Claims**



1. A method of recovering viscous oil from a subterranean, permeable, viscous oil-containing formation, said formation being penetrated by at least three wells, one injection well and one production well, said injection well being in fluid communication with a substantial portion of the formation, said production well containing two flow paths from the surface, the first being in fluid communication with the upper ½ or less of the formation, and the second being in fluid communication with the bottom ½ or less of the formation, and an infill well located between the injection well and production well in fluid communication with no more than the lower 50 percent of the recovery zone defined by the injection and production wells, comprising:

(a) injecting a thermal oil recovery fluid comprising steam into the injection well and recovering fluid including oil from the formation by the first flow path in the production well until the fluid being recovered from the production well comprises a predetermined amount of steam or water;

(b) simultaneously injecting a predetermined volume of a solvent or a mixture of solvent and hot water or steam, said solvent being liquid at injection conditions, into the formation via the second flow path of the production well;

(c) recovering fluids including solvent and petroleum from the formation via the second flow path;

(d) repeating steps (b) and (c) for a plurality of cycles;

(e) thereafter continuing injecting a thermal oil recovery fluid into the injection well and recovering fluids including oil from the formation by the infill well until the fluid being recovered comprises a predetermined fraction of steam or water;

(f) thereafter injecting hot water into the infill well while continuing injecting a thermal recovery fluid into the injection well and recovering fluids from the formation by means of the second flow path in the production well until the percentage of water in the fluids being recovered reaches a predetermined value; and thereafter

(g) injecting a thermal recovery fluid comprising steam into the infill well and injecting a fluid into the injection well and recovering fluids from the formation via both flow paths in the production well initially until the fluids being recovered comprise at least 80 percent water.

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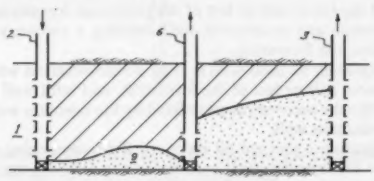
**4,166,503**

## HIGH VERTICAL CONFORMANCE STEAM DRIVE OIL RECOVERY METHOD

**Wilbur L. Hall, Bellaire; Alfred Brown, Houston, and Ralph J. Korstad, Austin, all of Tex., assignors to Texaco Inc., White Plains, N.Y.**

**Filed Aug. 24, 1978, Ser. No. 936,559**
**Int. Cl.[2] E21B *43/24***
**U.S. Cl. 166—263** **21 Claims**



1. A method of recovering viscous oil from a subterranean, viscous oil containing formation, said formation being penetrated by at least three wells, one injection well and one production well, both of said injection and production wells being in fluid communication with a substantial portion of the formation, and an infill well located between the injection well and production well in fluid communication with only the lower 50 percent of the formation and located within the recovery zone defined by the injection and production wells, comprising:

(a) injecting a thermal oil recovery fluid comprising steam into the injection well and recovering fluid including oil from the formation by the production well until the fluid being recovered from the production well comprises a predetermined amount of steam or water;

(b) thereafter recovering fluids including oil from the formation by the infill well until the fluid being recovered comprises a predetermined fraction of steam or water;

(c) injecting steam into the infill well and recovering fluids from the formation via the production well, and simultaneously injecting an aqueous fluid into the injection well at a rate sufficient to ensure maintenance of a positive pressure gradient between the injection well and infill well;

(d) injecting an effective amount of a hydrocarbon into the infill well sequentially or simultaneously with steam injection;

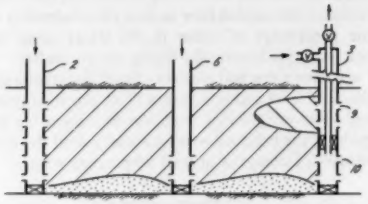
(e) continuing injecting steam or steam and hydrocarbon into the infill well and recovering fluids including oil from the formation via the production well until the water cut of the produced fluids is at least 80 percent.

**4,166,504**

## HIGH VERTICAL CONFORMANCE STEAM DRIVE OIL RECOVERY METHOD

**Alfred Brown; Wann-Sheng Huang, and Yick-Mow Shum, all of Houston, Tex., assignors to Texaco Inc., White Plains, N.Y.**

**Filed Aug. 24, 1978, Ser. No. 936,557**
**Int. Cl.[2] E21B *43/24***
**U.S. Cl. 166—272** **36 Claims**



**1.** A method of recovering viscous petroleum from a subterranean, permeable, viscous petroleum-containing formation, comprising:

(a) providing an injection well containing a flow path in fluid communication with at least a portion of the petroleum formation;

(b) providing a production well containing at least two separate flow paths, the first path establishing communication between the surface of the earth and the upper half or less of the petroleum formation and the second establishing fluid communication between the surface of the earth and the lower half or less of the petroleum formation, said injection and production well defining a recovery zone within the formation;

(c) providing an infill well in fluid communication with the bottom half or less of the formation, said infill well being within the recovery zone defined by the injection well and production well;

(d) injecting a thermal oil recovery fluid comprising steam into the injection well and recovering a fluid comprising water and petroleum from the formation via the production well until the fluid being recovered from the production well comprises a predetermined amount of steam or water;

(e) thereafter continuing injecting a fluid into the injection well and recovering fluids including petroleum from the formation by the infill well until the fluid being recovered comprises a predetermined fraction of steam and water;

(f) injecting a fluid whose mobility is less than steam into the upper portion of the formation adjacent to the production well by means of the first flow path therein in an amount sufficient to reduce permeability of at least a portion of the treated zone;

(g) injecting a thermal oil recovery fluid into the infill well and continuing injecting fluid into the injection well, and recovering fluids from the bottom of the formation adjacent the production well by means of the second flow path of the production well until a percentage of water in the fluid being recovered reaches a predetermined value.

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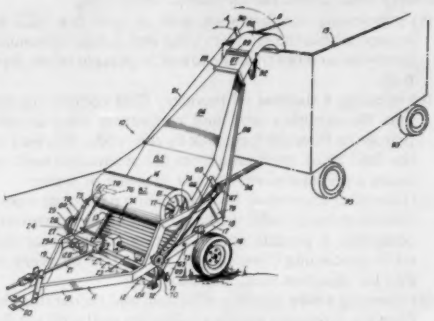
**4,166,505**

## METHOD AND APPARATUS FOR HARVESTING GREEN PEANUTS

**Frederick P. West, Rte. #1, Dawson, Ga. 31742**

**Filed Feb. 14, 1977, Ser. No. 768,154**
**Int. Cl.[2] A01D *91/02***
**U.S. Cl. 171—1** **5 Claims**

**1.** In a method of harvesting peanuts from their growing implacement in a row in the ground wherein the exposed peanut vines are severed from the implanted peanuts, said severed vines are removed from the row, the implanted peanuts are dug from their growing implacement in the ground, and the freshly dug peanuts are delivered into a combine means wherein the peanuts are cleaned for drying, the improvement comprising: in the delivery step, the steps of conveying said freshly dug peanuts along an upwardly inclined path and simultaneously imparting side-to-side and up-and-down movement to said path which shakes said peanuts in a lateral direction and jars said peanuts in an upwardly direction, thereby causing the dirt to be removed from the peanuts.



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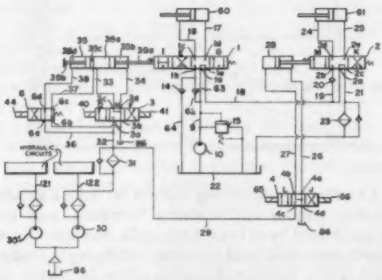
**4,166,506**

## CONTROLLING APPARATUS FOR BULLDOZER BLADE

**Iwao Tezuka, and Chikashi Chagawa, both of Hirakata, Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan**

**Continuation-in-part of Ser. No. 653,905, Jan. 30, 1976, abandoned. This application Sep. 28, 1977, Ser. No. 837,421**
**Claims priority, application Japan, Jun. 30, 1975, 50/80693; Jun. 30, 1975, 50/80699**
**Int. Cl.[2] E02F *3/76***
**U.S. Cl. 172—4.5** **9 Claims**



**1.** A controlling apparatus for the operation of a bulldozer blade, comprising:

(a) a hydraulic circuit connected between a hydraulic power source and cylinder means including a hoist cylinder for hoisting and lowering the bulldozer blade and a tilt cylinder for tilting the same, said hydraulic circuit including electromagnetic valve means for controlling said cylinder means;

(b) an electric circuit electrically connected between an electric power source supply for supplying an electric signal into said electric circuit and said electromagnetic valve means, to effect manual and automatic operations of the bulldozer blade said electric circuit including a main switch, first switching means for selectively changing said electric circuit into a circuit for the manual operation or a circuit for the automatic operation, a safety relay connected with said first switching means adapted to be actuated only when said first switching means is maintained in

a position where said electric circuit is changed into the manual operation circuit thereby preventing unexpected operation of said blade, a manual operation preferential relay connected with said safety relay, a load reading relay connected with said safety and manual operation preferential relays and adapted to be actuated by a signal fed from a load detecting circuit so as to send the electric signal from said manual operation preferential relay to one of the solenoids of said electromagnetic valve means, and second switching means manually controlled by the operation of an operating lever and adapted to turn off said manual operation preferential relay with the result of opening the automatic operation circuit when said second switching means is turned off in response to the operation of the operating lever for effecting the manual operation of the bulldozer blade; and

(c) means for detecting a load applied to the bulldozer blade, said load detecting means being mounted on a push arm for supporting the bulldozer blade and being electrically connected with said load detecting circuit.

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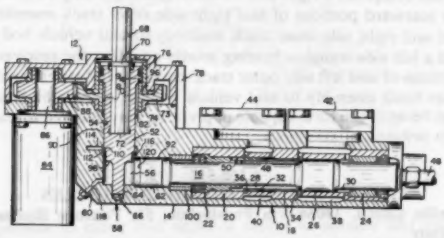
**4,166,507**

## PERCUSSIVE DRILLING APPARATUS

**John V. Bouyoucos, Rochester, and Robert F. DeLaCroix, Penfield, both of N.Y., assignors to Hydroacoustics, Inc., Rochester, N.Y.**

**Filed Mar. 6, 1978, Ser. No. 883,565**
**Int. Cl.[2] B25D *9/00***
**U.S. Cl. 173—105** **9 Claims**



1. A rotary percussive drill for delivering impacts to a rock formation which comprises a housing having a first section and a second section which are disposed generally perpendicular to each other, said first and second sections respectively having first and second intersecting bores which have their axes perpendicular to each other, a hammer reciprocally mounted in said first bore, a shank for receiving a drilling implement reciprocally mounted in said second bore, an impact piston also reciprocally mounted in said first bore adjacent one end of said hammer in impact receiving relationship therewith, said piston and said shank and the walls of said bores at the intersection thereof defining a chamber containing hydraulic fluid, said shank and said impact piston defining a hydraulic force coupling spring for transferring impact energy from said impact piston to said shank, said hydraulic fluid in said chamber having sufficient stiffness such that the Q of said spring is between 0.7 and 1.5, where

$$Q = \frac{R_L}{\sqrt{K_S M_H}}$$

where $R_L$ is the characteristic impedance of the drilling implement and the shank, $K_S$ is the stiffness of said spring and $M_H$ is the hammer mass, and where $N_L$ is between 0.45 and 1.8, where $N_L$ is the ratio $K_S/K_L$, and $K_L$ is the effective stiffness presented to the spring by the formation through the drilling implement and the shank, rotation and drive means coupled to said shank and contained in said second section, and oscillator means including said hammer for reciprocating said hammer contained in said first section, said housing sections providing a configuration for said drill which adapt said drill for use in confined areas.

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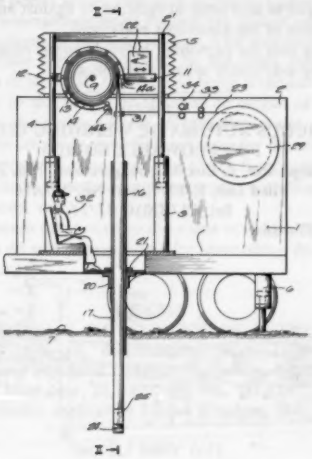
**4,166,508**

## METHOD AND A DEVICE FOR INTRODUCING A TUBULAR ASSEMBLY INTO THE SOIL

**Arie P. van den Berg, Heerenveen, Netherlands, assignor to Ingenieursbureau A.P. van den Berg B.V., Heerenveen, Netherlands**

**Filed Nov. 23, 1977, Ser. No. 854,159**
**Claims priority, application Netherlands, Nov. 24, 1976, 7613060**
**Int. Cl.[2] E02D *3/10***
**U.S. Cl. 175—20** **21 Claims**



1. The method of driving a tube into the soil and pulling the tube from the soil comprising the steps of,

forming a tube from a plurality of strips of longitudinally flexible material each of which strips is separately coiled and is characterized by assuming a bowed cross section when relaxed and has substantial rigidity when under tension or compression and its longitudinal edges restrained,

releasably connecting the adjacent edges of said strips,

forcing the tube through a rigid guide to the soil by application of axial force on the tube,

the soil serving to laterally support the tube below grade,

and withdrawing the tube from the soil while disconnecting the edges of the strips and winding the strips back on their respective coils.

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**4,166,509**

## PROCESS FOR EXCAVATING AND CONSTRUCTING TUNNEL AND EXCAVATING DEVICE

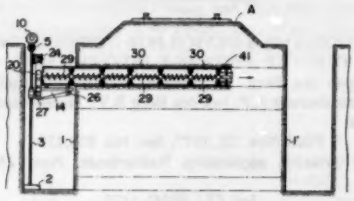
**Toshiyuki Ueno, Funabashi; Isamu Itoh, Tokyo, and Yasuyuki Morita, Mitaka, all of Japan, assignors to Japanese National Railways, Tokyo, Japan**

**Division of Ser. No. 824,614, Aug. 15, 1977. This application Jul. 6, 1978, Ser. No. 922,324**
**Int. Cl.[2] E21D *9/04***
**U.S. Cl. 175—94** **4 Claims**

1. An excavating device for use in the construction of a tunnel, comprising:

an excavator body adapted to be mounted on a forward end of one of a plurality of box-shaped hollow casing units having shapes which conform to imaginary segments obtained by dividing the imaginary peripheral portion of a tunnel to be constructed, in both the longitudinal and transverse direction of said tunnel;

at least one pair of cutter wheel assemblies arranged in side-by-side relation and mounted on shafts which are



arranged in said body at right angle against an advancing direction of the excavator body; and

a driving unit for providing a synchronous rotation in said side-by-side cutter wheel assemblies.

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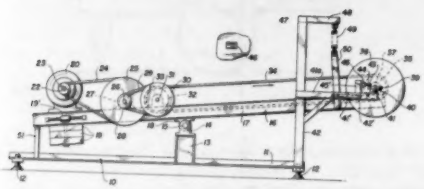
**4,166,510**

## CONTINUOUS AUTOMATIC WEIGHING CONVEYOR FOR FLOWABLE SOLIDS

**Paul H. Hege, Rte. 2, Box 353, Hagerstown, Md. 21740**

**Filed Dec. 5, 1977, Ser. No. 857,416**
**Int. Cl.[2] G01G *11/14***
**U.S. Cl. 177—16** **4 Claims**



**1.** An automatic continuously weighing and registering conveyor comprising a supporting base, a conveyor frame tiltably mounted on the supporting base, an endless conveyor means on said frame including power drive and adjustable counterweighting means mounted near one end of said frame, a rotating disc directly driven by the endless conveyor means near the end of said frame which is remote from said power drive and counterweighting means, a coacting comparatively small diameter wheel on the supporting base and positioned at one side of the disc in a plane at right angles to the disc and being resiliently biased into frictional contact with the disc and driven in rotation by the disc in response to rotation of the latter, the rotational speed of said wheel varying with displacement of the disc due to tilting of the conveyor frame under load, and weight register means operatively engaged with said wheel.

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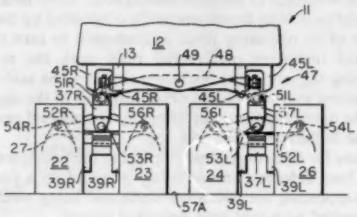
**4,166,511**

## FOUR-TRACK LOW GROUND PRESSURE CRAWLER VEHICLE

**Robert N. Stedman, Chillicothe, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Jun. 27, 1977, Ser. No. 810,548**
**Int. Cl.[2] B62D *55/06***
**U.S. Cl. 180—9.5** **12 Claims**

**1.** A crawler track vehicle comprising: a vehicle body, four spaced-apart crawler track assemblies disposed beneath said vehicle body and extending lengthwise with respect thereto, said crawler track assemblies including a right side outer track assembly, a right side inner track assembly, a left side outer track assembly and a left side inner track assembly, and a suspension system for supporting said vehicle body on said four track assemblies, said suspension system having *means for coupling a forward portion of said vehicle body to a forward portion of each of said track assemblies and means for coupling relatively rearward portions of said vehicle body to a rearward portion of each of said track assemblies, said suspension system further having* vertical oscillation means *for* enabling independent oscillation of the forward portion of each of said track assemblies about a transverse axis extending transversely with respect to said vehicle, and having lateral oscillation means *for* enabling joint oscillation of said outer and inner right side track assemblies about a right longitudinal axis extending



lengthwise with respect to the right side of said vehicle and *for* enabling joint oscillation of said left side outer and inner track assemblies about a left longitudinal axis extending lengthwise with respect to the left side of said vehicle *and which is spaced apart from said right longitudinal axis, said joint oscillation of said outer and inner right side track assemblies being independent of said joint oscillation of said outer and inner left side track assemblies.*

**2.** The combination of claim **1** wherein said lateral oscillation means comprises a right side trunnion bearing jointly coupling the rearward portions of said right side outer track assembly and said right side inner track assembly to said vehicle body, and a left side trunnion bearing jointly coupling the rearward portions of said left side outer track assembly and said left side inner track assembly to said vehicle body said trunnion bearings being of the form capable of pivoting movement in at least two orthogonal directions.

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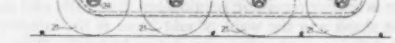
**4,166,512**

## CHASSIS FOR OFF-THE-ROAD VEHICLES

**Emilio Giletti, 13064 Via Provinciale, 51, Ponzone Biellese, Italy**

**Filed Nov. 9, 1977, Ser. No. 849,836**
**Int. Cl.[2] B62D *55/00***
**U.S. Cl. 180—9.64** **8 Claims**



**1.** A chassis for a vehicle which comprises an engine, first and second sets of ground-engaging wheels at opposite respective sides of the vehicle, axles upon which the ground-engaging wheels are mounted, sprocket wheels connected to the axles, and drive chains connecting the engine drivingly to the sprocket wheels, whereby all the ground-engaging wheels are driven to rotate, the chassis comprising first and second side members and at least two cross members connecting the side members together, the first and second side members supporting the first and second sets of ground-engaging wheels respectively and each having a wall for supporting thereon a portion of a body of the vehicle and each comprising a first box-shaped element which is disposed to have its open side facing outwardly of the vehicle and is connected to said cross members, and a second plate-shaped element which is releasably secured to the first element as the open side thereof, whereby the two elements each define a closed recess, and said second element having bushings fixed thereto for supporting said axles respec-

tively with the sprocket wheels connected thereto being located within the closed recess, so that upon removal of the second element from the first element the bushings, axles, sprocket wheels and chains may be separated from the vehicle.

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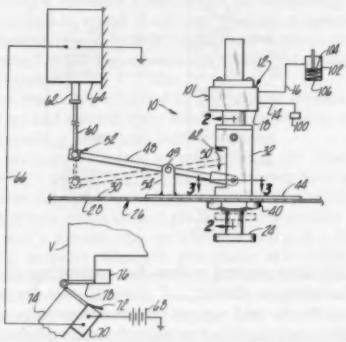
**4,166,513**

## SAFETY-BRAKE CONTROL SYSTEM FOR VEHICLES

**Buford D. Johnson, Rte. #3 - 3551 Black Hwy., Adrian, Mich. 49221**

**Filed Mar. 16, 1978, Ser. No. 887,183**
**Int. Cl.[2] B60T 7/12**
**U.S. Cl. 180—271** **10 Claims**

1. A safety-brake control system for a motor vehicle having brakes and a source of electrical power, said safety-brake system comprising valve means and operator-movable actuator means for actuating said valve means between a brake-applied position and a brake-released position, electrical control means operatively associated with said actuator means and operable to move said actuator means to actuate said valve means to the brake-applied position, circuit means including switch means connecting said power source to said electrical control means, said electrical control means being selectively



operable to move said actuator means to actuate said valve means to the brake-applied position in response to operation of said switch means, actuation of said valve means to the brake-released position being achieved only by operator movement of said actuator means.

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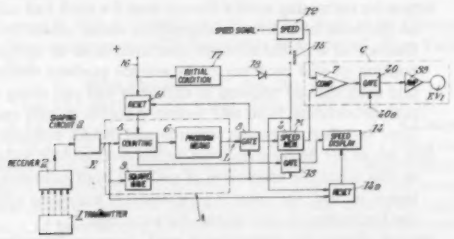
**4,166,514**

## DEVICES FOR CONTROLLING A SPEED RESTRICTION FOR VEHICLES, PARTICULARLY MOTOR VEHICLES

**Jean-Claude de Fréminville, Garches, and Michel Horblin, Courbevoie, both of France, assignors to Societe Anonyme Automobiles Citroen, Paris, France**

**Filed May 12, 1977, Ser. No. 796,237**
**Claims priority, application France, May 19, 1976, 76 15092**
**Int. Cl.[2] B60K 31/00**
**U.S. Cl. 180—167** **11 Claims**



1. A device for automatically restricting the speed of a vehicle, particularly a motor vehicle, travelling over a stretch of road subject to a speed restriction in accordance with speed limit information coming from outside the vehicle, comprising:

means for coding speed limit information received from outside the vehicle including a shift register having n outputs each assuming one of two possible logic states;

program means responsive to said means for coding to provide an electrical voltage in correspondence with received speed limit information, said program means comprising n+1 voltage divider bridges each having an intermediate point between a constant voltage souce and ground, each intermediate point being connected to a common line by a diode, the n+1 diodes associated with the intermediate points being connected so that the greatest of the voltages appearing at the intermediate points appears on the common line;

electrical connection means connected between the n intermediate points whose voltage is normally higher than that of the intermediate point having the lowest voltage and the n outputs of the shift register, said electrical connection means being responsive to the logic states at the outputs of said shift register and being arranged such that for one of the two logic states at an output of said shift register, the voltage at the intermediate point associated with this output is cancelled, whereas for the other of the two logic states at an output of the shift register the voltage at the intermediate point associated with this output is maintained; and,

control means responsive to the value of the voltage which appears on said common line for controlling the speed of the vehicle.

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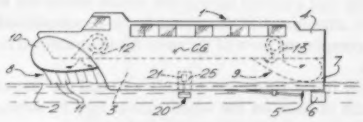
**4,166,515**

## SIDEWALL GAS-CUSHION VEHICLES

**Edward G. Tattersall, Southampton, England, assignor to Hovermarine Transport Limited, Hampshire, England**

**Filed Mar. 28, 1977, Ser. No. 781,814**
**Claims priority, application United Kingdom, Mar. 29, 1976, 12490/76**
**Int. Cl.[2] B60V 1/11**
**U.S. Cl. 180—119** **6 Claims**



1. A gas-cushion vehicle, provided with sidewalls, comprising:

hydrodynamic means for generating lift forces;

the sidewalls defining recesses for receiving the hydrodynamic means and having bottom portions with downwardly and inwardly sloping surfaces, each of the hydrodynamic means having a bottom of corresponding form; and,

means for extending the hydrodynamic means from said recesses into operable positions below the sidewalls and for retracting the hydrodynamic means into inoperative positions within the recesses, whereby the hydrodynamic means enclose said recesses and are substantially flush with the bottom portions of the sidewalls.

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**4,166,516**

## ADJUSTABLE CASTER

**Elmer T. Thurmond, Jr., Miami, Fla., assignor to Equipment Company of America, Hialeah, Fla.**

**Filed Jan. 10, 1978, Ser. No. 868,376**
**Int. Cl.[2] E04G 3/16; B60B 33/04**
**U.S. Cl. 182—15** **16 Claims**

1. An adjustable caster assembly for supporting a loadable movably positionable structure comprising:

a rotatable wheel,

a wheel mount for axially supporting in rotatable relationship said rotatable wheel,

a shaft revolvably mounted to said wheel mount,

external adjustment means for rotating said shaft relative to said wheel mount,

a connecting rod disposed in screw-threaded engagement with said shaft,

a sleeve adapted for sliding engagement with said connecting rod,

a bias element disposed interiorly of said sleeve to provide spring-like compression between said sleeve and said connecting rod, when the caster assembly is under load,

said sleeve fixedly attached to the loadable movably positionable structure,

the relative spatial disposition of the connecting rod and the sleeve being fixed under no load conditions,

the relative spatial disposition of the connecting rod and the

sleeve being fixed when the shaft is rotated relative to the connecting rod, thereby effecting longitudinal displacement of the rotatable wheel, in the absence of bias element resistance,

said external adjustment means disposed in spatial proximity with said wheel mount,

whereby rotation of said shaft relative to said connecting rod effects the longitudinal adjustment of said caster while the position of the bias element remains uneffected,

whereby said external adjustment means allows the longitudinal adjustment of the caster to be accomplished while the component parts of the same are in assembled relationship,

whereby the adjustment manipulations and the concomitant effects of same on the wheel mount may be substantially simultaneously visually monitored,

whereby the longitudinal adjustment of the caster is accomplished independent of bias element resistance.

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**4,166,517**

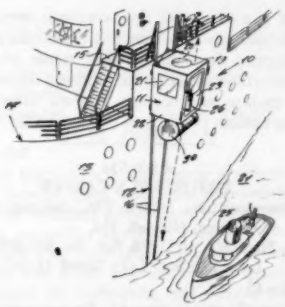
**PILOT'S POWER ELEVATOR**

**Chuck A. Henderson, 12300 39th Ave., Kenosha, Wis. 53142**

**Filed Jan. 5, 1978, Ser. No. 867,017**

**Int. Cl.[2] D66B *11/00*; B63B *27/16***

**U.S. Cl. 187—6** **5 Claims**



1. A pilot's power elevator, comprising in combination: a vertical track mounted on an outside of a tall ship, said track comprising a pair of rails extending from below a water level up to a bridge, an elevator cab guided by, directly mounted on and vertically movable along said rails, winch means mounted on said bridge, a cable operatively connected to said winch means and said cab to raise and lower said cab along said rails, and flotation means secured adjacent the underside of said cab.

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**4,166,518**

**ELEVATOR CONTROL SYSTEM**

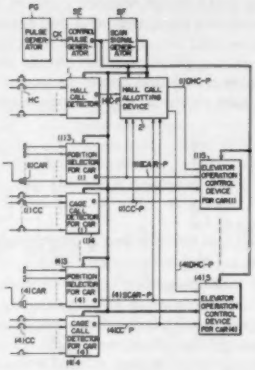
**Masao Nakazato; Takeo Yuminaka, and Kenji Yoneda, all of Katsuta, Japan, assignors to Hitachi, Ltd., Japan**

**Filed Jul. 26, 1977, Ser. No. 819,052**

**Claims priority, application Japan, Jul. 30, 1976, 51-91459**

**Int. Cl.[2] B66B *1/18***

**U.S. Cl. 187—29 R** **11 Claims**



1. An elevator control system for controlling an elevator system including a plurality of elevator cars for serving a plurality of floors, said control system comprising:

hall call means provided on each floor for producing separately up and down hall calls indicative of calling for upward and downward travel services, respectively, from said each floor;

service load estimating means provided for each car to estimate service loads indicative of time intervals which will be required for said each car to reach respective positions where said each car can respond to the hall calls derived from the respective floors, and

means for selecting one of said cars to be allotted to each hall call on the basis of such service loads estimated for said each hall call by the estimating means of the respective cars,

said service load estimating means comprising:

end floor estimating means for estimating whether said each car will maintain its predetermined travelling direction unit it reaches an end floor or not;

means for estimating such a service load for each hall call on the basis of a distance-dependent value, which is a function of a spatial distance measured from an instant position of said each car to its service position where said each car can respond to said each hall call along a path proceeding from said instant position to said end floor and then returning towards said instant position;

first means for determining said distance-dependent value so that when the estimation of said end floor estimating means is "yes" the value is progressively increased with the increasing of said spatial distance, and

second means for determining said distance-dependent value so that when the estimation of said end floor estimating means is "no" the value is progressively increased with the increasing of said spatial distance in a first range of said path up to said end floor and then

progressively decreased with the increasing of said spatial distance in a second range of said path exceeding said end floor.

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**4,166,519**

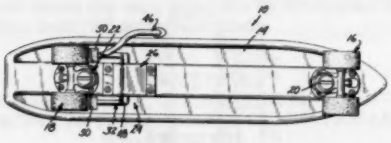
## SKATEBOARD BRAKE

**Michael J. Maloney, 4800 Oxborough La., Bloomington, Minn. 55437**

**Continuation of Ser. No. 756,138, Jan. 3, 1977, abandoned. This application Apr. 14, 1978, Ser. No. 896,242**

**Int. Cl.[2] B60T** *1/04;* **A63C** *17/14*

**U.S. Cl. 188—29** **10 Claims**



1. In combination with a free-wheeling ground engaging vehicle having a platform, a top surface for supporting a rider, a bottom surface to which is secured platform suspension and support members, and lateral edges, said support members having ground engaging wheels, apparatus for braking said vehicle comprising:

a bracket releasably attached to the bottom surface of said platform and spaced apart from said suspension and support members along said bottom surface;

a lever pivotally mounted to said bracket for rotation between first and second positions, said lever having a first arm extending above said top surface and proximate one of the lateral edges of said platform for actuation by said rider and a second arm to which is secured a frictional braking member disposed proximate said wheels, said frictional braking member having first and second oppositely disposed sides, said first side disposed on said braking member to selectively engage said wheels with said first arm disposed proximate one of the lateral edges while said second side remains disengaged, said second side disposed on said braking member to selectively engage said wheels with said first arm proximate the other of the lateral edges while said first side remains disengaged, each of said first and second sides having wheel engagement surfaces, said selected oppositely disposed side disengaged from said wheels in said first lever position and frictionally engaged with said wheels in said second lever position, said pivot axis of said lever disposed so that the force of gravity acting on said second arm provides a moment to said lever to bias said lever toward said first position;

whereby said rider by actuating said first arm rotates said lever to said second position causing one of said wheel engagement surfaces to frictionally engage said wheels.

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**4,166,520**

## PROTECTIVE ELASTOMERIC BRAKE ROD SEALING BOOT

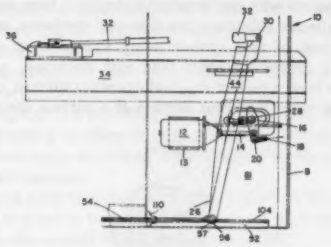
**Thomas B. Baker, and Edward H. Sittner, both of St. Charles, Mo., assignors to ACF Industries, Incorporated, New York, N.Y.**

**Filed Oct. 17, 1977, Ser. No. 842,514**

**Int. Cl.[2] B61H** *13/34;* **F16D** *3/84, 65/00;* **F16J** *15/56*

**U.S. Cl. 188—33** **4 Claims**

1. In a railway freight car brake system in which a brake rod passes through a hollow structural member, the improvement which comprises: an elastomeric boot attached to said structural member adjacent to an entrance to said structural member; said boot having a brake rod opening through which said rod passes in entering said structural member; said brake rod including at least one fork located at an end of the brake rod adjacent said entrance, said fork having a diameter larger than said brake rod; said boot engaging the brake rod sufficiently to substantially prevent moisture from passing through the boot and into said structural member; said boot being made of strong and rugged elastomeric material which has sufficient flexibility to allow said brake rod to move longitudinally and laterally during application and release of the brakes, and which has sufficient stretching capability to allow expansion of the brake rod opening sufficiently that said fork may pass through said brake rod opening temporarily deforming the



elastomeric boot during disassembly of said brake system, whereby said brake rod opening will return to its original shape after said fork has passed through said brake rod opening.

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**4,166,521**

## STAINLESS STEEL BRAKE DISC STRUCTURE

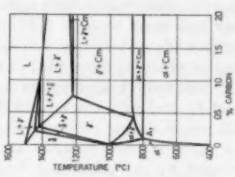
**Hiromu Okunishi, Saitama; Hideki Nakaji, Kawagoeshi; Hiroyuki Suwa, Saitama, and Hideaki Sato, Kawagoeshi, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Feb. 10, 1977, Ser. No. 767,341**

**Claims priority, application Japan, Feb. 17, 1976, 51-16783**[U]; Apr. 2, 1976, 51-36732; Apr. 17, 1976, 51-43964

**Int. Cl.[2] F16D** *69/02*

**U.S. Cl. 188—251 M** **6 Claims**




1. A brake disk characterized in that it is fabricated substantially of a martensitic stainless steel plate material containing at least 10% chromium and having a suitable surface hardness for a brake, wherein said surface hardness of said martensitic stainless steel plate material is determined by imperfect quenching of said material from a heated temperature within the range of the shaded zone of $\alpha+\gamma$ and $\alpha+\gamma+Cm$ in the accompanying Fe-Cr-C state diagram as shown in FIG. 9.

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**4,166,522**

## PNEUMATIC SPRING DEVICE

**Christian Bourcier de Carbon, 64, Blvd. Maurice-Barres, Neuilly-sur-Seine, France**

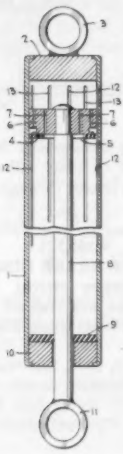
**Continuation of Ser. No. 792,570, May 2, 1977, abandoned. This application Aug. 31, 1978, Ser. No. 938,719**

**Int. Cl.[2] F16F** *9/48*

**U.S. Cl. 188—287** **6 Claims**

1. A pneumatic spring device, comprising, a pneumatically-pressurized cylinder closed at one end and having a guide element at an opposite end thereof, a piston within said cylinder, a rod connected to said piston and extending outwardly of said cylinder through an opening in said guide element, said

piston being movable toward said guide element during an extension of said rod outwardly of said cylinder and being movable toward said one end during a retraction of said rod inwardly of said cylinder, said piston having a predetermined thickness and delimiting variable first and second chambers within said cylinder respectively located between said piston and said one end and between said piston and said opposite end, an inner surface of said cylinder having at least one axial groove therein with one terminal end spaced from said one end of said cylinder a distance less than said thickness, an opposite terminal end of said groove being spaced from said guide element a distance greater than said thickness, said piston having at least a pair of co-axial openings therein, said piston having an outer undercut portion at a surface thereof facing



said guide element, one of said openings extending into said undercut portion, a circular lip of flexible material attached to said piston surface and being in tight frictional engagement with said inner surface of said cylinder, and said lip overlying said undercut portion, whereby movement of said piston during the extension of said rod is braked by the frictional engagement between said lip and said inner surface, and whereby movement of said piston during the extension of said rod is dampened a first amount from between said ends of said groove as determined by the pneumatic flow through said groove and both said openings from said second to said first chamber, and is dampened a second amount greater than said first amount between said opposite terminal end and said guide element as determined by the pneumatic flow through only the other of said openings from said second to said first chamber.

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**4,166,523**

## HYDRAULIC SHOCK ABSORBER FOR VEHICLES

**Katsuhiko Fujii; Hitoshi Nakano, both of Niiza, and Tetsuro Mitsui, Shiki, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Feb. 17, 1978, Ser. No. 878,947**

**Claims priority, application Japan, Feb. 22, 1977, 52-20486[U]**

**Int. Cl.[2] F16F *9/36***

**U.S. Cl. 188—322** **17 Claims**

1. A hydraulic shock absorber for a vehicle, comprising:

a cylinder having at least a portion thereof supported by a wheel of said vehicle;

a piston slidably disposed in said cylinder;

a hydraulic pressure chamber disposed in said cylinder between at least one end of said piston and a closed portion of said cylinder;

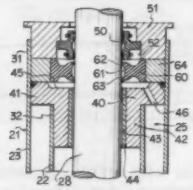
a piston rod movable with said piston and extending out of at least one end of said cylinder;

said piston rod having at least a portion thereof supported by a portion of the body of said vehicle;

a rod guide disposed between said piston rod and said cylinder to guide said piston rod;

an elastic body disposed proximal said rod guide for tightening, enclosing, and supporting at least a portion of the outer periphery of said piston rod;

the respective ends of said cylinder and rod being supported on the wheel side and vehicle body side so that vibrations and shocks from said wheel are absorbed by the oil pressure generated within said cylinder by sliding of said piston including said rod;



said elastic body being adapted to elastically tighten said outer periphery of said rod so as to enclose, tighten and support the outer peripheral part of said rod;

an oil seal member being provided above said rod guide around said rod;

said elastic body being provided between the upper part of said rod guide and the lower part of said oil seal member provided above said rod guide; and

said elastic body being adapted to tightly support said piston rod in a center position with substantially greater elasticity and rigidity than the tightening force of said oil seal member.

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**4,166,524**

## CLOSURE FOR SILO DORMER

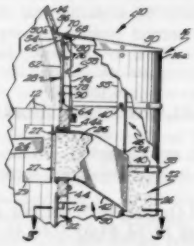
**Raymond R. Price; Lawrence A. Olejnizak, and Roger V. Olejnizak, all of Rochester, Minn., assignors to Rochester Silo, Inc., Rochester, Minn.**

**Continuation-in-part of Ser. No. 721,561, Sep. 8, 1976, Pat. No. 4,062,434. This application Dec. 13, 1977, Ser. No. 860,042**

**The portion of the term of this patent subsequent to Dec. 13, 1994, has been disclaimed.**

**Int. Cl.[2] B65G *65/36*; E04H *7/22***

**U.S. Cl. 193—34** **11 Claims**



1. An improved silo assembly comprising:

a vertically upright silo of tubular configuration;

a plurality of vertically spaced apart discharge orifices in said silo through which silage may be discharged;

an elongated, generally U-shaped chute extending vertically upwardly along said silo in overlying relationship with respect to said discharge orifices;

means defining an access passageway and a separate silage discharge passageway within said chute;

means for selectively permitting passage of discharged silage from different levels within said silo to said separate silage discharge passageway;

a dormer at the top of said chute defined by a vertical extension of said chute and a roof cap extending thereover;

a dormer opening in the top of said silo above the uppermost one of said discharge orifices and communicating with the space inside of said dormer; and

door means overlying said dormer opening, said door means comprising a flexible closure flap in sealing engagement with the periphery of said door opening, hingedly attached to one peripheral side of said dormer opening and detachably secured along at least one other side thereof, said closure flap being detachable for the opening thereof from inside said access passageway.

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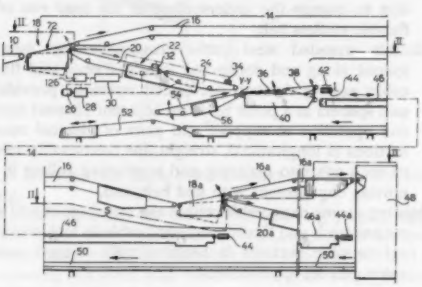
**4,166,525**

## INSTALLATION FOR THE DISTRIBUTION OF FOOD PRODUCTS, PARTICULARLY CONFECTIONERY PRODUCTS

**Carlo L. Bruno, Oundle, England, assignor to Alisyncro S.a.s. di Bruno & C., Lieni, Italy**

**Filed Jan. 17, 1978, Ser. No. 870,168**
**Claims priority, application Italy, Jan. 25, 1977, 67154 A/77**
**Int. Cl.[2] B65G *47/31, 47/68***
**U.S. Cl. 198—437** **11 Claims**



1. Installation for the distribution of food products, particularly confectionery products, of the type comprising:

a number of conveyors aligned longitudinally to carry along a primary conveyor line rows of said products extending transverse to the direction of movement of the conveyor;

a first alignment device for aligning the products in transverse longitudinally spaced apart rows along said such primary conveyor line;

a number of transverse conveyors, arranged transversely with respect to the primary conveyor line, to receive rows of products from said primary conveyor line and feed them in single longitudinal files to respective packaging machines, and

a number of transfer means, disposed upstream of each transverse conveyor, to transfer transverse rows of products from said primary conveyor line to the respective transverse conveyors, wherein the transfer means each comprise:

a secondary conveyor line (**22**), for conveying transverse rows of products (P) in a direction generally parallel to the direction of the primary conveyor line (**14**), said secondary conveyor line (**22**) comprising a first bunching conveyor (**20**), capable of assuming selectively a first speed matched to that of the primary conveyor line (**14**) and a second speed, higher than said first speed, and a second bunching conveyor (**24**) capable of assuming selectively a first speed matched to that of the respective transverse conveyor (**44**) and a second speed equal to the second speed of the first bunching conveyor (**20**);

a deflecting device (**18**) movable between an inactive position and an active position in which it deflects transverse rows of products (P) from the primary conveyor line (**14**) to the first bunching conveyor (**20**) of the secondary conveyor line (**22**);

a second alignment device (**36**) to align the products (P) supplied by the second bunching conveyor (**24**) of the secondary conveyor line (**22**) in transverse longitudinally spaced apart rows;

a transfer device (**38**) for transferring transverse rows of products (P) to said respective transverse conveyor (**44**);

drive means (**26, 28, 126**) for driving intermittently the two bunching conveyors (**20, 24**) and control means (**30,32,34**) for activating said drive means (**26, 28, 126**) in a repeated cycle of operations comprising:

(i) moving the first bunching conveyor (**20**) at its first speed and stopping it when it is saturated with products (P), simultaneously displacing the deflecting device (**18**) to its inactive position;

(ii) moving both bunching conveyors (**20,24**) at their second speed in order to transfer all the products (P) from the first (**20**) to the second bunching conveyor (**24**);

(iii) moving the second bunching conveyor (**24**) at its first speed, while the deflecting device (**18**) is displaced into its active position and the first bunching conveyor (**20**) resumes its first speed to be re-loaded with products (P);

(iv) aligning the products (P) fed by the second bunching conveyor (**24**) in transverse longitudinally spaced apart rows, and

(v) transferring the transverse rows of products (P) to the transverse conveyor (**44**) by means of the transfer device (**38**).

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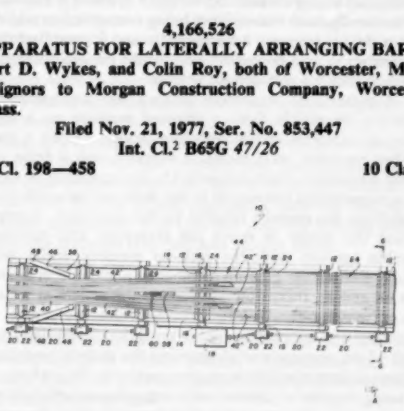
**4,166,526**

## APPARATUS FOR LATERALLY ARRANGING BARS

**Robert D. Wykes, and Colin Roy, both of Worcester, Mass., assignors to Morgan Construction Company, Worcester, Mass.**

**Filed Nov. 21, 1977, Ser. No. 853,447**
**Int. Cl.[2] B65G *47/26***
**U.S. Cl. 198—458** **10 Claims**



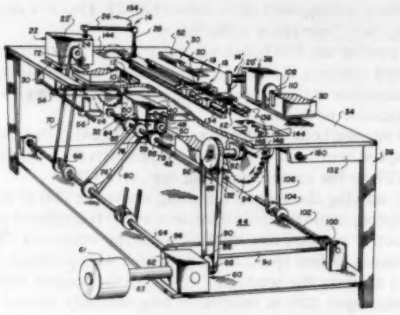
1. Apparatus for laterally arranging bars moving longitudinally along a conveyor, said apparatus comprising: guide means for laterally confining the bars; first divider means downstream from said guide means for subdividing the bars into a plurality of first bar packs which are laterally spaced one from the other; and second divider means downstream from said first divider means for further subdividing said first bar packs into laterally spaced second bar packs, said first and second divider means each consisting of at least one pair of upper and lower discs, the upper disc of each pair being rotatable about an axis spaced vertically above said plane and the lower disc of each pair being rotatable about an axis spaced vertically beneath said plane, the upper and lower discs of each pair being arranged to laterally separate bars moving longitudinally into contact therewith.

4,166,527

## DEVICE FOR PICKING UP AND PLACING ARTICLES ON MOVABLE CONVEYORS AND ASSEMBLY LINES AND TO AN ENDLESS CONSTRUCTION AND TO AN ARTICLE PICKUP AND DEPOSIT DEVICE THEREFOR

Earl F. Beezer, Hillsdale, N.J., assignor to Stelron Cam Company, N.J.

Filed Aug. 1, 1977, Ser. No. 820,833
Int. Cl.[2] B65G 37/00
U.S. Cl. 198—486 8 Claims



1. A device for use with a moving conveyor for placing and removing articles therefrom, comprising an article transmitter support, a reciprocator device having a rotatable shaft being adapted to be connected to the conveyor for rotation in timed relationship thereto, at least one rod member in said reciprocator device movable backwardly and forwardly in longitudinal directions, cam means connected to said shaft for rotation thereby and acting on said rod member to move it backwardly and forwardly, said rod member being connected to said reciprocator device to move it backwardly and forwardly in timed relationship to said conveyor, and means on said reciprocator device to pick up and deposit articles.

8. A method of accurately placing and alternatively, for removing, an article from a selected position on a moving conveyor using an article handling device having a pick-up member mounted on a movable support, and a drive motor having a rotatable shaft connected to the conveyor to move it, and a reciprocator connected to the shaft and movable support for shifting the support relative to the conveyor, comprising starting the motor to move the conveyor and moving the movable support with the pick-up member while simultaneously shifting the pick-up member to position it in alignment with an article, thereafter picking up the article at an article station, moving the pick-up member with the article while advancing the support so as to bring it substantially to the speed of the conveyor while moving the pick-up member to a position to drop the article on the conveyor, the pick-up member being capable of alternatively removing an article from the conveyor after the support is first brought up to the speed of the conveyor and thereafter shifting the support relative to the conveyor to bring the support alongside an article receiving station and moving the pick-up member into alignment with the receiving station to deposit the article thereon.

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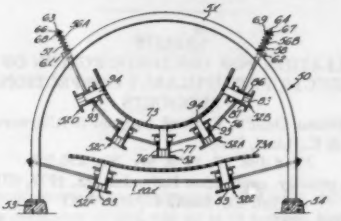
4,166,528

## LONGITUDINAL SUPPORT FOR A CONVEYOR BELT

Elmer J. Renner, Aurora, Ill., assignor to Stephens-Adamson, Inc., Aurora, Ill.

Filed Apr. 10, 1978, Ser. No. 895,120
Int. Cl.[2] B65G 15/08
U.S. Cl. 198—825 5 Claims

1. In a belt conveyor;
a frame;
an endless belt of a flexible material;
a support for said belt including a plurality of pairs of spaced apart, longitudinally extending frame channel members arranged in spaced-apart back-to-back relationship, said pairs of channel members having a plurality of diametrically related wells spaced along the longitudinal length of said channel members;
spacers between said channel members operative to maintain said channel members in parallel, spaced-apart relationship, each of said spacers being located at the ends of the sections of said channel members and arranged so as to be common to the adjacent ends of adjacent channel members;
a roller support having laterally extending shaft members supported in each related pairs of said wells and in position to engage the undersurface of the load run of the flexible endless belt;



flexible stranded steel cable cross-suspension members spaced along and connected to said frame, said flexible cable passing through preformed openings provided in said spacers at a point between adjacent channel sections and operative to support said pairs of channel member sections in longitudinal, straight-line relationship relative to each other to maintain said supporting rollers in supporting engagement with said belt; and,
locking means engageable within the openings in said spacers and with said flexible stranded cable to lock said channel member sections in longitudinally aligned, spaced-apart parallel relationship.

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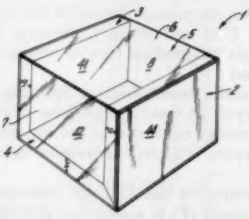
4,166,529

## CYLINDER STYLE DISPLAY BOX

David Adamek, Minneapolis, Minn., assignor to Champion International Corporation, Stamford, Conn.

Filed Mar. 14, 1978, Ser. No. 886,345
Int. Cl.[2] B65D 65/16
U.S. Cl. 206—45.34 13 Claims



1. A cylinder type display box made from a single sheet of paperboard material, said box including a base and first and second upstanding sidewalls, said box further including a plastic sleeve member disposed over said base and sidewalls so as to form a plastic front wall, top wall, and back wall, said base and sidewalls being generally prismatic in configuration, said first side wall including a first inner side panel and a spaced apart substantially parallel first outer side panel, said second sidewall including a second inner side panel and a spaced apart

substantially parallel second outer side panel, said base including a base panel and a spaced apart substantially parallel base cushion panel, said base including a pair of substantially parallel locking slits extending from said front wall to said back wall, each of said slits being adjacent to one of said sidewalls, the opposite ends of each slit being flared toward its respective adjacent sidewall, each of said sidewalls including a locking portion receivable in the slit adjacent thereto, each of said locking portions including a central portion integral with its respective sidewall and a pair of end tabs, the end tabs being received in the flared portions of its respective slit for locking the sidewalls into the base portion.

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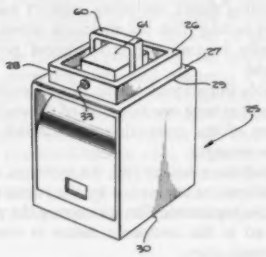
**4,166,530**

## BOWLING BALL STORAGE AND TRANSPORTATION APPARATUS

**Charles H. Robinson, 1066 Thompson, Glendale, Calif. 91201**

**Filed Aug. 22, 1977, Ser. No. 826,367**
**Int. Cl.[2] B65D *85/00***
**U.S. Cl. 206—315 B** **3 Claims**




1. A bowling ball storage and transporting apparatus comprising:

(a) a geometrically uniform housing having parallel upper and lower walls, said housing having an interior compartment adapted to fully enclose the bowling ball and an opening in a front wall thereof for ingress to said interior compartment;

(b) a first interlocking member depending from the upper wall of said housing, said first interlocking member comprising four vertical surfaces projecting upwardly from the upper wall of said housing each of said walls being parallel to the edges of said upper wall, said vertical surfaces being separated by a depression intermediate said vertical surfaces;

(c) a resiliently loaded projection pin depending outwardly from one of the vertical surfaces of said first interlocking member;

(d) a second interlocking member depending from the bottom wall of said housing, said second interlocking member being adapted to engage said first interlocking member whereby said first and second interlocking members are laterally coupled to one another, said second interlocking member including a receiving surface adapted to engage said resiliently loaded projection pin and prohibit vertical movement thereof when the first interlocking member of a first bowling ball sotrage and transporting apparatus engages the second interlocking member of a second bowling ball storage and transporting apparatus; and

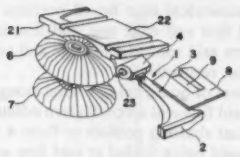
(e) a covering member having first and second side flanges pivotally coupled within the interior compartment of said housing, a first surved section disposed intermediate said first and second side flanges, said curved section tangentially depending into a lower front wall for said housing and including a shim affixed to the inside of said covering member within the interior compartment of said housing, said shim having a concave profile substantially the same as the bowling ball and adapted to be urged against the midline of the bowling ball.

**4,166,531**

## PACKING DEVICE FOR ELECTRIC FAN OF ASSEMBLED TYPE

**Hirofumi Fujiwara, Moriguchi, Japan, assignor to Sanyo Electric Co., Ltd., Osaka, Japan**

**Filed Mar. 24, 1978, Ser. No. 890,021**
**Claims priority, application Japan, Mar. 24, 1977, 52-36239[U]; Mar. 24, 1977, 52-36240[U]**
**Int. Cl.[2] B65D *85/64, 85/68***
**U.S. Cl. 206—320** **13 Claims**




1. A packing device and a disassembleable electric fan therefore said electric fan comprising a supporting arm having a casing portion for housing switch means and supporting a driving motor, a separable base portion for holding said supporting arm, said base portion having a longitudinal recess on an upper face thereof for receiving said casing portion when said fan is assembled, a blade assembly and a pair of guards, said packing device comprising a first shell formed of a cushioning material having a first recess for accommodating therein said blade assembly and said pair of guards stacked with one on top of the other, a second recess for accommodating therein said supporting arm wherein said first and second recesses are positioned with respect to one another such that said blade assembly and guards do not overlap said supporting arm, and a third recess for accommodating therein said base portion, said third recess being positioned with respect to said second recess such that said base portion and said supporting arm overlap with each other and are spaced from one another, and a second shell formed of said cushioning material, said second shell being engageable with said first shell for holding said fan components between said first and second shells.

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**4,166,532**

## PACKAGE FOR BATTERIES

**Takashi Tsuchida, Kosai; Kenichi Shinoda, Toyohashi; Kohei Yamamoto, Kosai; Fumio Ikuma, Hamamatsu, and Yuzo Tanaka, Kosai, all of Japan, assignors to Fuji Electrochemical Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 780,184, Mar. 22, 1977, abandoned. This application Apr. 21, 1978, Ser. No. 898,853**
**Int. Cl.[2] B65D *65/02***
**U.S. Cl. 206—333** **5 Claims**

1. In a battery package of the type including a plurality of

cylindrical batteries, each having opposite circular ends, each said battery having at a first circular end thereof a terminal projection, said batteries being juxtaposed such that all of said terminal projections extend in the same direction, the improvement wherein said package further comprises:

a header board formed of a single sheet of board, said board having opposite first and second end edges equally spaced from a center line, and first and second intermediate lines, each said intermediate line being spaced by an equal distance from said center line on opposite sides thereof, such that first and second symmetrical intermediate board portions are formed between said center line and said first and second intermediate lines, respectively, and first and second symmetrical skirt board portions are formed between said first end edge and said first intermediate line and between said second end edge and said second intermediate line, respectively;

said single sheet of board being folded along said cetner line such that said first and second intermediate board portions are in mutual abutting contact to form a wall, said single sheet of board being folded at said first and second intermediate lines such that said first and second skirt board portions extend outwardly from opposite sides of said wall to form a skirt, said skirt having an elliptical configuration when viewed from a direction along said wall and perpendicular to said center line;

said header board being positioned with said skirt covering said first circular ends and said terminal projections of all of said batteries, with said skirt board portions being inclined relative to said first circular ends of said batteries, said inclined skirt board portions defining therebetween a free space within which said terminal projections are completely enclosed; and

a heat-shrunk thermoplastic film covering the outer exposed cylindrical surfaces of said batteries and said skirt, said film holding said header board to said batteries in a position such that said terminal projections are completely covered by said skirt.

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**4,166,533**

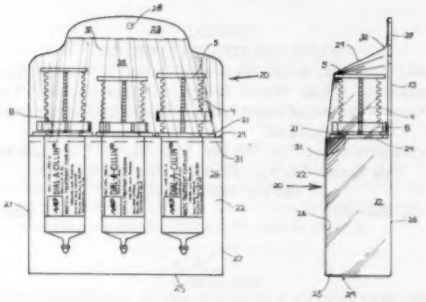
## BIOSTABLE SELF-CONTAINED PACKAGE OF A PLURALITY OF VETERINARIAN SYRINGES

**Robert L. Maitland, Norwich, Conn., assignor to Masti-Kure Products Company, Inc., Norwich, Conn.**

**Filed Feb. 7, 1978, Ser. No. 875,852**

**Int. Cl.[2] B65D *77/22***

**U.S. Cl. 206—366** **10 Claims**



1. A biostable, self-contained package of a plurality of veterinary syringes of the type having a cylindrical barrel, piston therein and discharge nozzle comprising:

(a) a self-supporting and free-standing syringe holder including,

(1) an enclosure means having upper, lower, side and end walls for receiving and completely enclosing a portion of the syringe such that at least the nozzle thereof is disposed within the enclosure means,

(2) a plurality of circular sealing apertures in the upper wall of the enclosure means for receiving the syringes into the enclosure means,

(3) a plurality of angularly shaped bendable sealing flaps disposed around the periphery of each sealing aperture and extending radially into the sealing aperture so that when the sealing flaps lie in the plane of the upper wall the sealing aperture is essentially closed but when the sealing aperture has a syringe received therein, the sealing flaps are bent into the enclosure means and form a close non-dust seal around the syringe wherein the sealing flaps are sufficiently bendable and resilient that a syringe may be repeatedly received by and removed from the sealing aperture and the non-dust seal is repeatedly restablished;

(b) a plurality of syringes received by the sealing apertures and partially disposed in and enclosed by the enclosure means, with the syringes being oriented upwardly in the vertical direction;

(c) an upstanding panel, including support means for said syringes projecting from the enclosure means and extending vertically beyond the upwardmost portion of the syringes; and

(d) a rupturable impervious plastic film extending from the end walls and at least one side wall of the enclosure means to a portion of the upstanding panel which is vertically beyond the syringes;

whereby the enclosure means and the syringes are biostably sealed from ambient contamination by the rupturable film and wherein when the rupturable film is removed the portion of the syringes disposed in the enclosure means is non-dust sealed from solid contamination.

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**4,166,534**

## PACKAGING ARTICLES

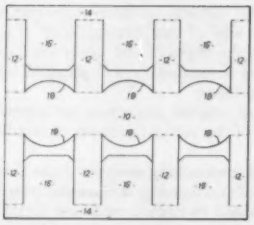
**James Bowden, 38 Mill Ct., Rutherglen, Glasgow, Scotland**

**Filed Dec. 20, 1977, Ser. No. 862,598**

**Claims priority, application United Kingdom, Dec. 23, 1976, 53928/76**

**Int. Cl.[2] B65D *75/52***

**U.S. Cl. 206—429** **18 Claims**



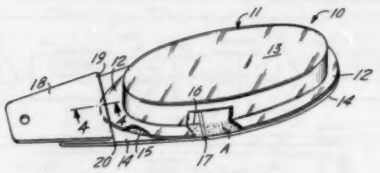
1. A blank of foldable sheet material for forming into a sleeve for packaging at least one article, the blank having a top forming panel, a plurality of spaced apart side forming panels hinged to each side of the top forming panel, a pair of strip panels hingedly joining the side forming panels, and at least one opposite pair of bottom forming panels provided by the sheet material between adjacent side forming panels as coplaner extensions of the strip panels, with no hinge lines between the bottom forming panels and their respective strip panels, said opposite pair of bottom forming panels extending from their respective strip panels toward the top forming panel a sufficient distance such that when the side forming panels are turned in the same direction relative to the top forming panel and the strip panels are turned mutually outwardly, away from each other, with the bottom forming panels remaining coplaner with their respective strip panels and extending towards each other, they overlap each other.

**4,166,535**

## PACKAGE STRUCTURE

**Donald A. Gilling, Neenah, Wis., assignor to American Can Company, Greenwich, Conn.**

**Filed May 10, 1978, Ser. No. 904,410**
**Int. Cl.[2] B65D *83/00***
**U.S. Cl. 206—470** **4 Claims**



1. Reclosable blister package structure comprising: a blister having a flanged portion and a raised product holding portion therewithin; a backing member releasably affixed along at least a portion of the periphery of said flanged portion and extending across said product holding portion of said blister, said backing member having a portion thereof folded over to present an edge extending over and engaging a section of said flanged portion of said blister, the construction and arrangement being such that pivotation of said folded portion away from said blister is effective to release said overlapped section of said flange portion from said edge, to thereby accommodate subsequent release of said backing member from said blister, and whereby said package may be reclosed and latched by engaging said flanged portion under said folded portion.

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**4,166,536**

## CORROSIVE CHEMICAL CONTAINMENT SYSTEM

**Robert Roberts, Wilmington, and Frank M. Chapman, Hockessin, both of Del., assignors to The Carborundum Company, Niagara Falls, N.Y.**

**Filed Mar. 16, 1977, Ser. No. 778,205**
**Int. Cl.[2] B23B *15/08*; B44D *1/16***
**U.S. Cl. 206—524.3** **22 Claims**

1. A corrosive chemical containment system, consisting essentially of:

(a) a metallic, corrosive chemical containment vessel;

(b) a homogeneous, porous, chemical corrosion barrier coating upon the inner surfaces of the vessel exposed to corrosive chemical, consisting essentially of:

(1) a matrix of chemical corrosion-resistant polymer, and

(2) from about 20 to about 40 parts by volume, per 100 parts by volume of chemical corrosion-resistant polymer matrix, of an inert filler having a maximum size ranging from about 0.25 to about 200 microns; and

(c) a corrosive chemical within the vessel, separated from the metallic vessel by the homogeneous, porous, chemical corrosion barrier coating.

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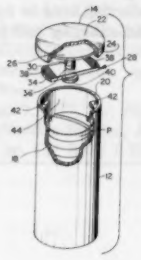
**4,166,537**

## WATERPROOF PILL CONTAINER

**Samuel F. Fortunato, 115 Bow St., East Greenwich, R.I. 02818**

**Filed Nov. 7, 1977, Ser. No. 849,522**
**Int. Cl.[2] B65D *39/18, 45/14***
**U.S. Cl. 206—535** **4 Claims**

1. A waterproof pill container, comprising an open top container base having a bottom wall and sidewalls upstanding therefrom, said base of longitudinally orientated cylindrical configuration such that relatively disc-like configured pills may be vertically stacked therein one upon the other with the lateral side edges of said pills spaced from said sidewalls, said sidewalls terminating in an upper peripheral edge, a circular cover having a top wall and adapted to close said open top by sealing contact of said top wall with said peripheral edge, and closure means for continually urging and maintaining said top wall in sealing contact with said edge, said closure means including a post integrally secured to the underside of said cover top wall at one end thereof and having its other lower end adapted to longitudinally downwardly extend into said container base, said other lower end of said post being threaded, a crossbar threadably secured to said lower post end, said crossbar laterally extending across said container base and terminating proximate to but spaced from opposed upper sidewall portions thereof, said upper sidewall portions each having inwardly laterally extending flanges adapted to overlie the end



portions of said crossbar wherein simultaneous engagement of said crossbar with said flanges and rotation of said top causes said top to move longitudinally with respect to said container base, the upper surface of said crossbar ends being knurled, said knurled end portions being adapter to contact the lower surface of said flanges, the lateral distance between said flanges being slightly greater than that of said pills such that they may move therepast for one at a time dispensing through said open top of said container base when the cover is removed from said base.

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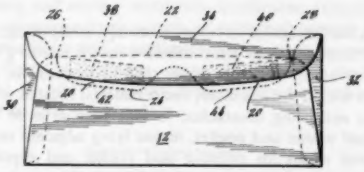
**4,166,538**

## EASY OPENING ENVELOPE

**Bill M. Nixon, Lewisville, and Perry A. Thornburg, Mesquite, both of Tex., assignors to Champion International Corporation, Stamford, Conn.**

**Filed Jul. 26, 1978, Ser. No. 928,231**
**Int. Cl.[2] B65D *27/38***
**U.S. Cl. 206—628** **2 Claims**



1. An easy opening envelope comprising:

a front panel;

a back panel having a common edge with said front panel and extending parallel thereto, said back panel having a tear panel adjacent its upper edge defined in part by perforations connecting a first point on the upper edge to a second, spaced point, said perforations extending generally parallel to the upper edge of said back panel except for an excursion portion which extends towards the upper edge of said back panel;

an elongated envelope flap connected along one side edge to an opposing edge of said front panel, said flap adapted to overlie a substantial portion of, but not all of, said tear panel when closed, the opposite side edge of the flap, when closed, extending generally parallel to but stopping

short of said perforations that are generally parallel to the upper edge of the back panel; and

adhesive means for securing said envelope flap to said tear panel over part of their facing surfaces, said adhesive means including spaced strips of adhesive material, each of said adhesive strips being formed at the free edge of said envelope flap, with the non-adhesive spacing area of the strips being located in facing relationship to said excursion portion of the perforations such that said envelope flap and said tear panel include a non-adhering area to permit a user to insert a finger or implement beneath the envelope flap in said non-adhering area to open said envelope by pulling the flap and adhering tear panel away from said back panel.

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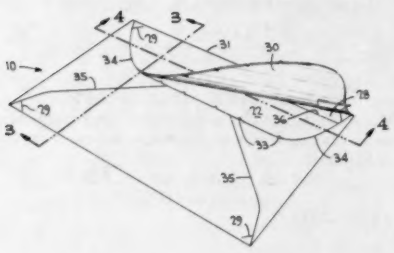
**4,166,539**

## ENVELOPE ASSEMBLY

**Robert H. Allen, North Tonawanda, and Victor J. Robertson, Niagara Falls, both of N.Y., assignors to Moore Business Forms, Inc., Niagara Falls, N.Y.**

**Filed Jun. 24, 1977, Ser. No. 809,922**
**Int. Cl.[2] B65D *27/34***
**U.S. Cl. 206—629** **8 Claims**



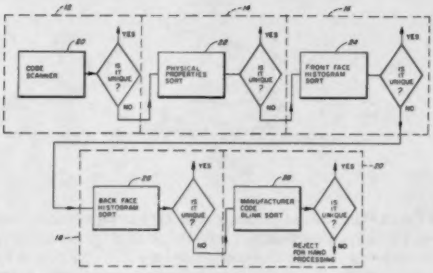

1. A stuffed, sealed envelope assembly, comprising, superimposed front and back plies, adhesive means securing said plies together along marginal edges thereof to form an envelope pocket within the assembly, insert material located within said pocket and being unattached to said plies so as to be freely disposed within said pocket, means lying adjacent one of said marginal edges for opening said pocket and exposing said insert material for extraction therefrom, said means comprising at least one cut line extending through only one of said plies and defining a pocket access opening, said cut line lying near one end of an edge of said insert material, said adhesive means securing said plies together along said one marginal edge comprising a stream of releasable glue to thereby further comprise said means for opening and exposing, and said cut line partially delimiting a portion of said one ply which may be separated along said insert material edge from the remainder of said one ply upon insertion of an opener through said access opening, the other of said plies being completely devoid of any means facilitating opening of said pocket, whereby said pocket may be opened and said insert material exposed for extraction therefrom as said portion is separated along said insert material edge from said remainder of said one ply upon exertion by the opener of a force causing the separation after the opener is inserted through said access opening.

**4,166,540**

## DOCUMENT SORTER UTILIZING CASCADED SORTING STEPS

**Robert Marshall, Clinton, Iowa, assignor to A. C. Nielsen Company, Northbrook, Ill.**

**Filed Jan. 26, 1978, Ser. No. 872,359**
**Int. Cl.[2] B07C *5/34***
**U.S. Cl. 209—555** **26 Claims**




1. A system for sorting documents comprising:

means responsive to a predetermined property of said documents for categorizing said documents into groups according to predetermined values of said property, said categorizing means including means responsive to the value of said property of each document for determining whether said value is unique to a particular class of documents, said uniqueness determining means including means for identifying said document when said value is unique to a particular class of documents; and

means responsive to a predetermined characteristic of said documents other than said property for categorizing the documents having values of said property that are not unique to a particular class of documents into groups according to predetermined parameters of said characteristic and the value of said property, said characteristic responsive categorizing means including means responsive to the parameters of said characteristic and the value of said property of each document for determining whether the combination of said parameter of said value is unique to a particular class of documents and for identifying said document when said combination is unique to a particular class of documents.

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**4,166,541**

## BINARY PATTERNED WEB INSPECTION

**Edmund H. Smith, Jr., Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Aug. 30, 1977, Ser. No. 829,248**
**Int. Cl.[2] B07C *5/00***
**U.S. Cl. 209—587** **5 Claims**

1. An automatic electro-optical scanning inspection system for detecting and locating a variety of defect conditions in a binary patterned web and subjects of inspection carried thereby having intricately designed planar surfaces which are characterized by binary signals representative of preselected features of said scanned surfaces, comprising

a radiation source trained on a subject of inspection,

electro-optical means scanning said subject of inspection and detecting modulated radiation representing transitions onto and off of said web from said subject of inspection,

said electro-optical means generating as data output binary electrical signals representative of the registration of patterns on said web and also the quality of individual features thereof,

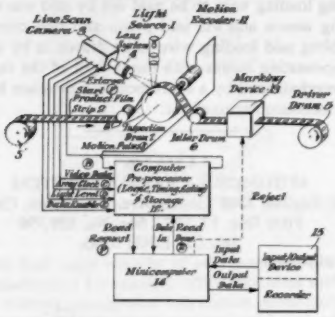
a computer pre-processor receiving said data output from said electro-optical means and composing binary words incorporating, as discrete components, the results of said electro-optical scanning together with the transverse

address locations of the transitions in the inspected area which was the subject of said electro-optical scanning,

means delivering said binary words to a computer,

said computer converting said binary words to unique status by incorporating machine direction location data therein,

said computer then comparing said unique binary words with binary words stored in said computer defining an acceptable product standard derived from a master locational pattern inclusive of preselected tolerance limits, and




means responsive to said computer passing or rejecting said subjects of inspection, said data pre-processor comprising a logic system receiving as input from said electro-optical means data enable, array clock and video data signals and means composing from said input, binary words incorporating, as discrete components, the results of said electro-optical scanning together with the transverse location address of the inspected area which was the subject of said electro-optical scanning, and means storing said binary words until read out by said computer.

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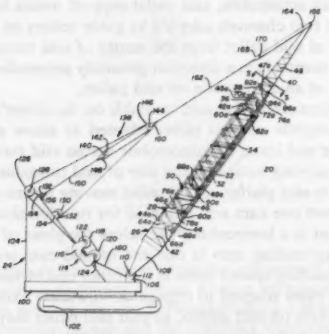
**4,166,542**

## TELESCOPING LATTICE BOOM CRANE

**John F. Bryan, Jr., 3212 Mapleleaf Cir., Dallas, Tex.**

**Filed Dec. 5, 1977, Ser. No. 857,604**
**Int. Cl.[2] B66C *23/04***
**U.S. Cl. 212—55** **16 Claims**



1. A crane comprising:

a first boom section pivoted at one end to a base,

a second boom section extending from the other end of the first boom section and slidable longitudinally relative to said first boom section,

at least one first sheave attached to the first boom section,

at least one second sheave attached to the second boom section,

topping means including a first block system comprised of sets of sheaves secured between the base and the second boom section,

at least one cable having one end fixed to one of the boom sections and extending about the first and second sheaves to the first block system, and

means located between the first boom section and the topping means for actuating the cable to selectively translate the second boom section and adjust the topping means.

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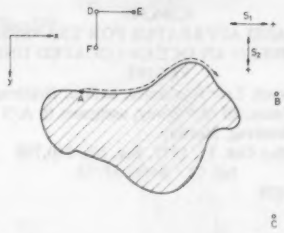
**4,166,543**

## METHOD AND MEANS FOR CONTROLLING AN INDUSTRIAL ROBOT

**Lars Dahlstrom, Vasteras, Sweden, assignor to ASEA Aktiebolag, Vasteras, Sweden**

**Filed Aug. 9, 1977, Ser. No. 823,067**
**Claims priority, application Sweden, Aug. 13, 1976, 7609062**
**Int. Cl.[2] B25J *9/00***
**U.S. Cl. 414—749** **22 Claims**



1. A method for controlling movement of an industrial robot with an arm movable with more than one degree of freedom in a robot coordinate system, including at least one transducer for sensing deviations of said arm in a definite sensing direction for each transducer wherein said transducer sensing directions do not correspond to any coordinate in said robot coordinate system, comprising:

(a) locating said arm in a first position within an intended operating range of said arm;

(b) displacing said robot arm a distance in a predetermined direction which has a component in said sensing direction of a transducer;

(c) sensing and storing robot arm coordinates, expressed in said robot coordinate system, of said displacement; and

(d) correcting robot coordinates during operation within said intended operating range upon sensing deviation sensed by said transducer with a correction calculated based on said stored values.

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**4,166,544**

## PIPE-LAYING MACHINE FOR OIL PIPELINES, CONDUITS AND THE LIKE

**Carlo Cecchi, and Alberto G. Bifani, both of Turin, Italy, assignors to Fiat-Allis Macchine Movimento Terra S.p.A., Lecce, Italy**

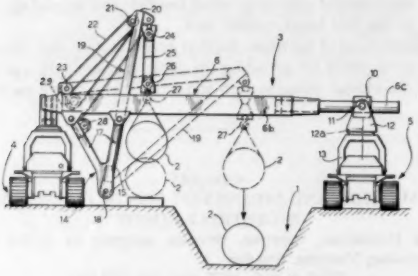
**Filed Aug. 25, 1977, Ser. No. 827,467**
**Claims priority, application Italy, Sep. 7, 1976, 69166 A/76**
**Int. Cl.[2] F16L *1/02***
**U.S. Cl. 414—747** **10 Claims**

1. An apparatus for laying pipe comprising

bridge means for forming a support from which pipe is moved into position in a trench and supported on opposite sides of a trench into which a pipe is to be placed,

a lifting arm pivotally supported at one end of said bridge means for engaging and moving a pipe into position in a

trench upon pivotal movement of said lifting arm about its pivotal support and



pivot means carried at each end of said bridge means for varying the position thereof relative to the supports on opposite sides of the trench.

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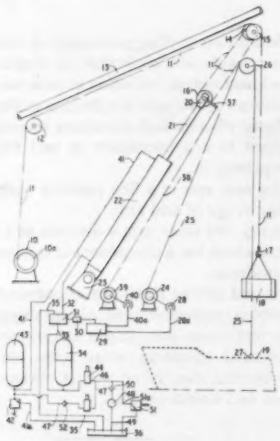
**4,166,545**

## METHOD AND APPARATUS FOR TRANSFERRING CARGO BETWEEN AN OCEAN-LOCATED UNIT AND A VESSEL

**Svein Martinussen; Leiv Roaldsnes, both of Brattvag, and Harald Roed, Vatne, all of Norway, assignors to A/S Hydraulik Brattvaag, Brattvag, Norway**

**Filed Oct. 11, 1977, Ser. No. 840,759**
**Int. Cl.[2] B65G 57/58**
**U.S. Cl. 414—139** **5 Claims**



1. Apparatus for transferring cargo either way between an ocean-located unit and a vessel by means of loading crane means with associated loading and unloading winch and especially under conditions of heavy wave movement at sea, which comprises the combination of

(a) means for recording the relative movement between said ocean-located unit and said vessel,

(b) wave-compensating means incorporating drive means therefor which when actuated enables loading wire to be drawn in or paid out in a controlled forwards and reverse movement independently of the drawing in or paying out of the wire by said winch, and

(c) means for controlling said wave-compensating means via its drive means and at least essentially in step with said relative movement indicated by said recording means, said control means comprising first and second control systems adapted to be actuated in unison in response to said relative movement thereby actuating said drive means, said first control system including a pressure accumulator, a source of pressure medium, a pressure discharge valve arranged between said accumulator and said source of pressure medium, a pump for the supply of pressure medium from said source and a valve arranged between said pump and said accumulator for controlling the pressure in said accumulator, said accumulator permitting the passage of pressure medium between said drive means and said source of pressure medium via said discharge valve enabling loading wire to be paid out by said wave-compensating means and via said pump and said control valve enabling said loading wire to be drawn in by said wave-compensating means with the weight of the cargo being counterbalanced by a corresponding pressure build up in said pressure accumulator.

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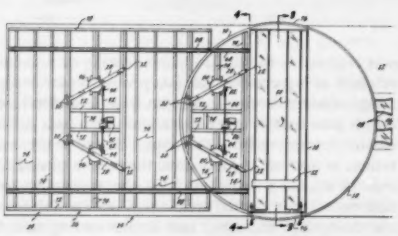
**4,166,546**

## AUTOMOBILE PARKING SYSTEM

**Ralph M. English, 2315 Lincoln Ave., San Diego, Calif. 92104**

**Filed Dec. 12, 1977, Ser. No. 859,798**
**Int. Cl.[2] E04H 6/06**
**U.S. Cl. 414—263** **3 Claims**



1. Automobile parking system turntable means movable among loading, storage transfer and unloading positions which comprises:

a generally flat circular turntable;

means supporting said turntable for rotation in a generally horizontal plane;

pallet support means at substantially the top center of said turntable supporting a rectangular pallet capable of carrying an automobile, said pallet support means including at least two channels adapted to guide rollers on the underside of said pallet from the center of said turntable off of said turntable in a direction generally perpendicular to the side of an automobile on said pallet;

a platform secured to said turntable on the driver's side of an automobile on said pallet adapted to allow a driver to enter and leave the automobile across said turntable;

pallet moving means on the side of said turntable top opposite to said platform, said pallet moving means comprising at least one cam arm mounted for rotation about the arm center in a horizontal plane below the plane of said pallet, an upstanding cam at one end of said cam arm and two upstanding spaced cams at the other end of said cam arm, said cams adapted to engage downwardly extending cam brackets on said pallets, so that said pallet may be moved across said pallet support means as said cam arm is rotated; and

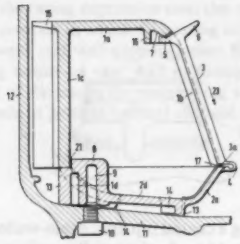
drive means for rotating said turntable among a first position where an automobile may be driven in a forward direction from an entrance road onto an empty pallet on said pallet support means, a second position where said pallet may be moved on or off said turntable by said pallet moving means and a third position where an automobile may be driven in a forward direction from a loaded pallet on said pallet support means onto said entrance road.

4,166,547

## TIDY BOX MADE ENTIRELY OF POLYPROPYLENE

Renato Castelli, 53, Koning Leopold II laan, B-9000 Gent, Belgium

Filed Sep. 18, 1978, Ser. No. 943,362
Int. Cl.[2] B65D *43/14, 51/04, 1/24*
U.S. Cl. 220—339 10 Claims



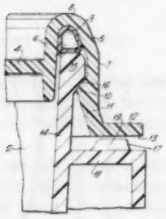
1. A tidy box made entirely of polypropylene suitable for keeping small items, for example office requisites such as pencils, pens, rubbers, and pocket calculators, small samples and small toilet and dress requisites, said box consisting only of two parts fitted together after moulding, one part, a lower part, forming the base of the box together with a lid having a catch or fastening lug on one side and a pull handle on the other side, the lid and the base being integrally connected by a polypropylene hinge so that the whole of said lower part constitutes only a single element, and the other part, an upper part, forms side portions, a top, back and front portion, the latter forming a fixed frame for the lid without any bottom cross-member, and the top having a notch and retaining edge, the whole of said upper part again constituting only a single element.

4,166,548

## CONTAINERS AND CLOSURES THEREFOR

Victor E. Crisci, Wellsburg, W. Va., assignor to Polysar Resins, Inc., Leominster, Mass.

Filed May 30, 1978, Ser. No. 910,535
Int. Cl.[2] B65D *39/00*
U.S. Cl. 220—308 5 Claims



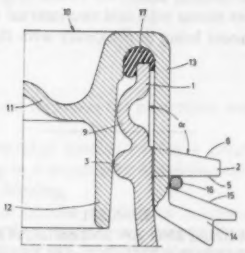
1. A container and closure assembly comprising a closure provided with a container closure portion surrounded by an annular rim portion, the rim portion including a downwardly depending annular flange and the container comprising a side wall terminating at its upper end in a rim, the closure being closed upon the container rim and the rim and rim portion having mutually engaged locking means retaining the closure upon the rim, the rim and rim portion axially compressing between them a resilient seal, the resiliency of which determines normal relative closed positions of the closure and container, and the closure being moveable under downward external pressure from the normal closed position further in the closing direction relative to the container so as to increase axial compression upon the seal, the closure and container mutually comprising an axially facing surface and a surface opposing the axially facing surface, the axially facing surface having a plurality of circumferentially spaced-apart ribs projecting axially therefrom and towards the opposing surface, the ribs being spaced from the opposing surface in the normal closed position of container and closure, movement of the closure in the closing direction causing the ribs and the opposing surface to engage one another to terminate said movement with gaps being formed between the axially facing and opposing surfaces at positions between the ribs into which a prizing tool may be inserted for removal of the closure from the container.

4,166,549

## WIDE-NECKED BARREL AND LID HAVING FASTENING MEANS

Udo Schütz, Rückersteg 4, D-5418 Selters, Westerwald; Michael Rudbach, Dorfstrasse, D-5419 Dierdorf-Wienau, and Bernd Breuer, Haindorf 36, D-5439 Rothenbach-Obersayn, all of Fed. Rep. of Germany

Filed Jun. 5, 1978, Ser. No. 912,076
Claims priority, application Fed. Rep. of Germany, Oct. 21, 1977, 2747327
Int. Cl.[2] B65D *45/32*
U.S. Cl. 220—319 4 Claims



1. In a wide-necked barrel made of synthetic resin with a removable lid, which lid has a lip-like inner rim axially interlocking into the barrel neck and an edge externally overlapping the barrel neck with a plurality of extensions oriented obliquely downward in a segment-like arrangement, which extensions receive between them projections integrally molded with the barrel neck, wherein the extensions of the lid and the projections of the barrel neck form a V-slot which extends in a circumferential direction for the reception of a tightening ring; the improvement in which the projections of the barrel neck have, in the longitudinal cross section of the barrel, a trapezoidal shape of solid cross section, the projections consisting of the solid synthetic resin of the barrel compressed in a plastic state, the synthetic resin material of the spaces between and at the same level as the projections of the barrel neck being displaced toward the interior of the barrel and forming a plurality of spaced supporting beads for the lip-like inner rim of the lid.

4,166,550

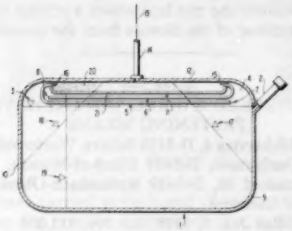
## INSTALLATION FOR VENTING FUEL TANKS, ESPECIALLY FOR MOTOR VEHICLES

Einhard Kleinschmit, Esslingen, and Dieter Scheurenbrand, Nellingen, both of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed Nov. 28, 1975, Ser. No. 635,795
Claims priority, application Fed. Rep. of Germany, Nov. 30, 1974, 2456726
Int. Cl.[2] B65D *25/00*; F16K *45/00*
U.S. Cl. 220—85 VR 14 Claims

1. An installation for venting fuel tanks, comprising at least two internal vent line means which terminate at respective discharge openings in the interior space of a fuel tank at least in proximity of opposite ends of the tank, said two internal vent

line means being operatively connected together within the central area of the tank, a junction means located in the tank interior space near the tank upper portion, and each internal vent line means extending from its discharge opening in the interior space of the tank toward an opposite end of the tank and from the latter toward said junction means, said junction



means being constructed as flow-interrupting chamber means, an external vent line in communication with the atmosphere being operatively connected with the flow-interrupting chamber means, and opening means for connecting said flow-interrupting chamber means with said two internal vent line means, said opening means being in proximity with the opposite ends of the tank.

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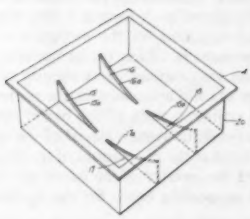
**4,166,551**

## MEANS FOR SHAPING AN INTERLEAVED STACK OF SHEETS TO IMPROVE THE POP-UP TYPE DISPENSING THEREOF

**Paul Stiros, Cincinnati, Ohio, assignor to Procter & Gamble Company, Cincinnati, Ohio**

**Filed Mar. 24, 1977, Ser. No. 780,813**
**Int. Cl.[2] B65D *85/16***
**U.S. Cl. 221—51** **3 Claims**



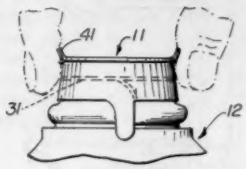
1. In a pop-up type dispensing package containing an interleaved stack of discrete, rectangular, stiff sheets and having a dispensing orifice above said stack, the improvement comprising means within said package to shape said sheet stack so as to have a central depressed portion with the interleaved portions of the sheets being non-planar and concave to improve the reliability of the pop-up type dispensing of said sheets, said package comprising a tray having four sides and a bottom to contain said stack and a cover for said tray having said dispensing orifice therein, said bottom of said tray constituting an integral part of said tray and comprising said means to shape said sheet stack, said bottom of said tray having a support surface for said stack which slopes inwardly and downwardly from each of said four tray sides.

**4,166,552**

## PLASTIC CAP AND CONTAINER CONSTRUCTION

**George W. Faulstich, San Carlos, Calif., assignor to Three Sisters Ranch Enterprises, San Carlos, Calif.**

**Continuation-in-part of Ser. No. 852,189, Nov. 16, 1977. This application Mar. 13, 1978, Ser. No. 885,619**
**Int. Cl.[2] B65D *41/48***
**U.S. Cl. 215—256** **5 Claims**




1. A cap having a central top disk, a thin-walled substantially cylindrical outer skirt of substantially uniform thickness depending from the periphery of said disk, said outer skirt being scored and weakened in a circumferential first line spaced downwardly from the top of said outer skirt and in a second line joining said first line and extending down to the bottom edge of said outer skirt, a tab attached to the bottom edge of said outer skirt adjacent said second line, an upper internal circumferential bead on said outer skirt between said first line and said disk, a lower internal second bead on said outer skirt below but adjacent said first line, both of said beads being interrupted in a series of gaps spaced around the circumference of said outer skirt forming bead sections, the sections of said upper bead between interruptions being substantially shorter than the sections of said lower bead between interruptions.

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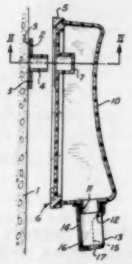
**4,166,553**

## DISPOSABLE DISPENSING-PROPORTIONING CONTAINER FOR SEMI-FLUID PASTY PRODUCTS IN GENERAL, AND COSMETICS PRODUCTS IN PARTICULAR

**Salvatore G. Fraterrigo, via Casoli, 17, Carpi, Modena, Italy**

**Filed Jun. 7, 1977, Ser. No. 804,251**
**Claims priority, application Italy, Mar. 30, 1977, 46843 A/77**
**Int. Cl.[2] B65D *35/52***
**U.S. Cl. 222—181** **6 Claims**



1. A disposable manually operable wall mountable dispenser comprising

a dispensing container having a dispensing outlet;

wall mounting means for mounting said container on a vertical wall and comprising, a plate of polygon outline having a cylindrical projection;

means for mounting the plate on a vertical wall so that the cylindrical projection extends generally horizontally from the vertical wall;

said dispensing container comprising, a casing for containing

the product to be dispensed and including a rear wall forming a portion of the product containing casing;

a cylindrical depression formed in the said rear wall, extending inwardly of said rear wall, and completely sealed with respect to and forming a part of the product containing portion of the rear wall;

said projection having a dimension to be a close fit in said depression to enable mounting the casing on the wall by pressing the casing depression onto the cylindrical projection to a position in which said casing substantially covers and obscures said wall support means from view;

cooperating means on said wall mounting means and said rear wall of the casing for maintaining said container in a predetermined general vertical attitude.

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**4,166,554**

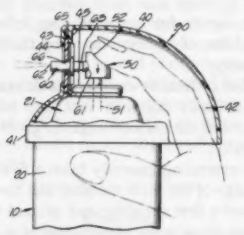
## AEROSOL SAFETY CAP HAVING HINGED NOZZLE

**Victor F. Anderson, Wenonah, N.J., assignor to Shell Oil Company, Houston, Tex.**

**Filed Sep. 23, 1974, Ser. No. 508,374**

**Int. Cl.[2] B67D *5/06***

**U.S. Cl. 222—182** **2 Claims**



**1.** An aerosol dispenser comprising:

an aerosol container;

a valve actuator disposed above said container and adapted to be depressed in a downward movement path towards said container for selectively dispensing contents therefrom;

a cover secured to the upper end of said aerosol container and extending about said valve actuator, said cover having a finger-entry passageway communicating with an aperture on one side of said cover, and a generally vertical side wall in which a window is formed, said window being disposed substantially parallel to said movement path of said actuator; and

a dispensing nozzle attached to said actuator and extending in a generally horizontal direction therefrom towards said window with the outer end of said nozzle projecting through said window;

said nozzle having a resilient hinge portion of reduced external diameter on its inner end whereby depressing said actuator directly from inside the cover causes contents to be dispensed from said container, but depressing the outer end of said nozzle from outside the cover causes said resilient hinge portion of reduced external diameter to bend without producing sufficient downward force on said actuator to result in a dispensing action.

**4,166,555**

## POCKET-SIZE DISPENSER FOR POWDER

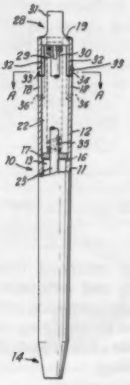
**Colin Cheetham, Hoddesdon, England, assignor to Clik-A-Sweet Limited, London, England**

**Filed Oct. 19, 1977, Ser. No. 843,649**

**Claims priority, application United Kingdom, Oct. 29, 1976, 45109/76**

**Int. Cl.[2] G01F *11/18***

**U.S. Cl. 222—365** **8 Claims**



**1.** A pocket-size dispenser for particulate material comprising:

a one-piece molded housing having a lower bore portion terminating in a constricted dispensing orifice at a lower end of the housing,

an upper bore portion of uniform cross-section which is larger than that of said lower bore portion and extending from a top end of said housing and connected to said lower bore portion at a shoulder,

a centrally bored partition means at the shoulder dividing the housing into a lower chamber for storing said particulate material and an upper chamber,

a valve member which is movable downwardly through said dispensing orifice to dispense a predetermined aliquot of said particulate material,

a rod rigid with said valve member and extending through said upper and lower chambers and through said bore in said partition means,

a plunger rigid with said rod,

a button on said plunger projecting through the top of said housing,

a skirt on said plunger slidingly fitting said upper bore portion,

at least one resilient ear extending downwardly from said skirt,

a boss extending radially outwardly from said resilient ear,

said housing having a lengthwise extending rectilinear slot located to receive said boss, the length of said slot determining the extent of dispensing movement of said valve member and providing upper and lower limits of travel of said valve member, rod and plunger,

a spring surrounding said rod and located against said partition means and said skirt between said rod and said ear to bias the plunger and valve member to an upper, closed position, and

said ear and boss being formed so as to allow snap-engagement of the assembly of said plunger, said spring, said rod and said valve member into said housing from the top end thereof,

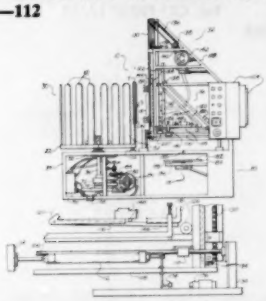
said dispenser comprising at least two of said bosses and at least two of said slots generally symmetrically disposed about the axis of said housing.

4,166,556

## APPARATUS FOR REMOVING FLACCID ARTICLES FROM FORMS AND STACKING THE ARTICLES IN LAID OUT CONDITION

Dulin L. Annas, Sr., Rte. 7, Indian Hills, Hickory, N.C. 28601

Filed Sep. 27, 1977, Ser. No. 837,227
Int. Cl.[2] A47J *51/06*; B65G *57/16*
U.S. Cl. 223—112 23 Claims



1. Apparatus for removing flaccid articles, for example stockings having toe and welt ends, from forms and stacking the articles in laid out condition comprising:

(a) movable means for engaging an article on a form adjacent extreme opposite ends of said article as at said toe and welt ends of a stocking;

(b) article receiving means;

(c) means for moving said article engaging means from said form to remove said article from said form and move it from said form while holding it in essentially the same configuration it had on said form to a position separate from said form over said receiving means in generally horizontally laid out disposition; and

(d) means for operating said article engaging means for said engaging said article on said form adjacent said extreme opposite ends of said article, to maintain said engaging during said removing, moving, and holding, and to release said article onto said receiving means in said laid out condition whereby said stacking is controlled and accurate.

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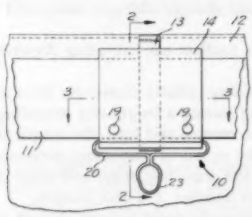
4,166,557

## BELT ATTACHED HANGER

Timothy E. Conley, Rte. 2, Echo, Oreg. 97826

Continuation of Ser. No. 649,829, Jan. 16, 1976, abandoned, which is a continuation of Ser. No. 237,673, Mar. 24, 1972, abandoned. This application Sep. 14, 1977, Ser. No. 833,006
Int. Cl.[2] A45C *1/04*
U.S. Cl. 224—101 1 Claim




1. The hanger support attachment for trouser belts comprising a belt for supporting a pair of trousers and belt loops to receive said belt and a hanger loop of flexible material having overlapping end portions permanently secured together, the hanger loop having a back side and a front side, an upright opening formed in only the back side of said hanger loop for permitting a belt loop to extend therethrough and engage about said belt so that the hanger loop is supported by said belt, and means supported by said hanger loop for securing devices to said hanger loop to be suspended below said hanger loop, said hanger loop being adapted to fit closely around said belt and entirely around the belt and completely covering said belt loop, said upright opening being generally rectangular in form and extending parallel to the opposite sides of said hanger loop, the upright opening extending from just below the top of the belt loop to just above the bottom of the belt loop.

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4,166,558

## INFANT CARRIER

Warren E. Schroeder, 70 Linwood Ave., Emerson, N.J. 07630

Filed Jul. 10, 1978, Ser. No. 923,147
Int. Cl.[2] A47D *13/02*
U.S. Cl. 224—158 9 Claims

1. An infant carrier for supporting an infant in a selected position at the front of a person carrying the infant, the infant carrier comprising:

a main member of flexible material, such as a textile, extending longitudinally between first and second ends and having first and second side edges of given contour spaced apart laterally;

a main strap extending laterally from a first location at the first side edge of the main member and having a length for passing over a first shoulder and around the back of said person, said main strap terminating at a second location longitudinally spaced from the first location along the first side edge;

a first loop at the first end of the main member;

a second loop located at the second side edge of the main member and spaced a first given distance from the first loop, said second loop being adapted to pass through the first loop;

a third loop located at the first side edge of the main member and spaced a second given distance from the first loop; and

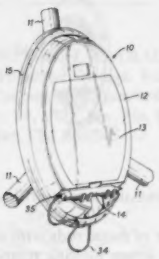
a head strap extending longitudinally from the second end of the main member, said head strap having a length sufficient to be routed around the back of said person, over the shoulder opposite to said first shoulder;

the first and second given distances, the length of the head strap, and the contour of each side edge between the first loop and the respective second and third loops being such that passage of the second loop through the first loop and routing of the head strap around the back of said person as aforesaid, thence through the third loop and the second loop, will enable a first portion of the main member bounded by the first, second and third loops to establish a seat for the infant at the front of said person, while a second portion of the main member bounded by the second loop, the third loop and the head strap will establish a back and head support for the infant.

## 4,166,559
## NOTEPAD ATTACHMENT

**Kenneth Richardson, New Romney, England, assignor to Memoriser Limited, Sussex, England**

**Filed Jan. 19, 1978, Ser. No. 870,812**
**Claims priority, application United Kingdom, Jan. 20, 1977, 02368/77**
**Int. Cl.² B60R *7/08***
**U.S. Cl. 224—276** **6 Claims**



1. An apparatus to be connected to the steering wheel of a vehicle for holding a notepad, said apparatus comprising:

a platform member to be positioned over the hub of said steering wheel normal to the axis of rotation of said steering wheel, said platform member having a rigid recess in the bottom thereof for receiving said notepad and a plurality of holes through said recess;

resilient cushion means surrounding and holding therein the edge of said platform member and positioned between said platform member and said steering wheel for cushioning said platform member from said steering wheel and for preventing said platform member from rattling against said wheel, the center portion of said cushion means being open behind said holes in said platform member; and

flexible cording means fitted through said holes in said platform member and surrounding said steering wheel beneath said platform member for securing said platform member and cushion means thereunderneath against said steering wheel.

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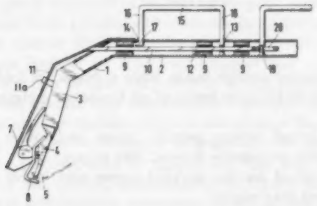
## 4,166,560
## CARGO CARRIER FOR MOTOR VEHICLES

**Lothar Werner, Marxstrasse 9, 7560 Gaggenau-Ottenau, and Siegfried Milke, Neptunstrasse 6, 7550 Rastatt 17, both of Fed. Rep. of Germany**

**Filed Oct. 20, 1977, Ser. No. 843,846**
**Int. Cl.² B60R *9/04***
**U.S. Cl. 224—42.1 F** **7 Claims**



1. A roof load support for motor vehicles having a tube of rectangular cross section having a straight upper portion and legs depending from the ends thereof;

said upper portion having spaced openings therein;

an inverted U-shaped load holder, the legs of which extend into said openings, the end of one of said legs being bent laterally within said tube;

a lock bar longitudinally slidable in and projecting from an end of said upper portion and having means slidably projectable into locking engagement with the other leg of said load holder, within said upper portion, to prevent withdrawal of said load holder from said openings.

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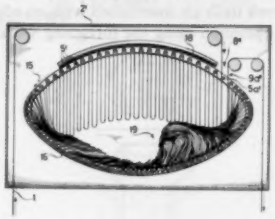
## 4,166,561
## APPARATUS FOR TREATING A WEB OF TEXTILE MATERIAL IN A DWELL ZONE

**Kurt Bruckner, Bad Konig, and Manfred Schuierer, Michelstadt, both of Fed. Rep. of Germany, assignors to Bruckner Apparatebau GmbH, Erbach, Fed. Rep. of Germany**

**Filed Dec. 30, 1977, Ser. No. 865,945**
**Claims priority, application Fed. Rep. of Germany, Jan. 13, 1977, 2701275; Oct. 12, 1977, 2745901**
**Int. Cl.² B65H *17/42*; D06B *23/04***
**U.S. Cl. 226—105** **6 Claims**



1. Apparatus for treating a web of textile material in a dwell zone, comprising a closed circuit, a plurality of suspension bars for carrying loops of the web of material around such circuit, means for guiding the suspension bars around the closed circuit, means for feeding the web downward at a fixed entrance point in such circuit to cause each passing suspension bar to pick up a loop of the web, and means for withdrawing the web continuously at a point in such circuit immediately preceding such entrance point, wherein the circuit has an elongate form with a substantially horizontal axis, and the entrance point and point of withdrawal of the web are located in the upper portion of the circuit, substantially ahead of a vertical median plane passing through said axis, and wherein the circuit includes an upper portion, a lateral portion preceding the upper portion and a transition portion between the lateral and upper portions, and the upper portion has a radius of curvature which is larger than the radius of curvature of the preceding lateral portion, and the entrance point and point of withdrawal of the web are located adjacent to the transition portion.

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## 4,166,562
## ASSEMBLY SYSTEM FOR MICROCOMPONENT DEVICES SUCH AS SEMICONDUCTOR DEVICES

**Alan S. Keizer, Huntingdon Valley, and Donald B. Brown, Willow Grove, both of Pa., assignors to The Jade Corporation, Huntingdon Valley, Pa.**

**Filed Sep. 1, 1977, Ser. No. 829,837**
**Int. Cl.² H01L *21/98***
**U.S. Cl. 228—5.1** **26 Claims**

1. Apparatus for use in the assembly of microcomponent devices, comprising:

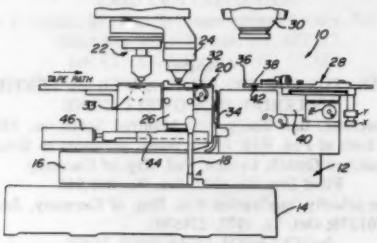
on a unitary machine frame, the following work tools,

(1) excising means for removing a tape mounted microcomponent device and its electrical leads from the tape;

(2) forming means for forming the electrical leads to a predetermined shape suitable for use in further assembly;

(3) transfer means for transferring the device and its formed leads to a pre-positioned substrate mounted on a support; and

(4) bonding means for bonding the formed leads to lead elements on the substrate;



whereby precise spatial relationships between the device, its leads and the work tools are maintained without adjustment for each assembly operation using the foregoing work tools.

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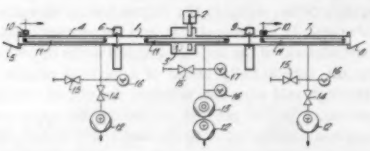
4,166,563

## TRANSFER MACHINE FOR SEALING ELECTRONIC OR LIKE COMPONENTS UNDER VACUUM

Dominique Peyraud, and Martial Voumard, both of Bienne, Switzerland, assignors to Societe Suisse pour l'Industrie Horlogere Management Services, S.A., Switzerland

Filed Sep. 27, 1977, Ser. No. 837,232
Int. Cl.[2] B23K *3/00;* C23C *13/08;* H01L *41/22*
U.S. Cl. 228—47 9 Claims



1. Transfer machine for sealing electronic or like components under vacuum comprising at least three serially interconnected elongated vacuum chambers in a linear arrangement, an elongated component carrying means for carrying said components through said transfer machine, said component carrying means being adapted to the form and dimensions of the vacuum chambers so as to be capable of being transported through said chambers successively, at least four valve means, a first thereof being positioned at an entrance opening into said first vacuum chamber, a second being positioned between said first and second vacuum chambers, a third being positioned between said second and third vacuum chambers and a fourth being positioned at an exit opening of said third vacuum chamber, which when closed isolate the vacuum chambers from one another and from the surrounding atmosphere, a sealing instrumentality in said second vacuum chamber arranged to effect sealing of the components in succession, and transport means actuable from the exterior so as to transfer the carrying means into and out said second vacuum chamber provided with sealing means without breaking the vacuum, the length of said carrying means being less than the distances between said successive valve means but the distance between said sealing instrumentality and at least one of said second and third valve means being less than the length of said carrying means.

4,166,564

## METHOD OF MAKING A MULTIORIFICE STRUCTURE

William G. Wolber, Southfield, Mich., assignor to The Bendix Corporation, Southfield, Mich.

Division of Ser. No. 792,426, Apr. 29, 1977, Pat. No. 4,109,870.
This application May 24, 1978, Ser. No. 909,078
Int. Cl.[2] B23P *3/02, 15/16*
U.S. Cl. 228—156 5 Claims

1. A method for making a multiorifice structure comprising the steps of:

coating a plurality of metal rods with a thin layer of a second metal having a lower melting temperature than the melting temperature of said metal rods;

stacking said plurality of coated rods in a predetermined geometrical pattern to form a stack;

heating said stack to a predetermined temperature sufficient to cause said thin layers to fuse leaving open interstices between said coated rods;

cooling said stack to a temperature below said predetermined temperature to form an integral assembly; and

slicing said integral assembly into thin wafers having the open interstices passing through said thin wafers.

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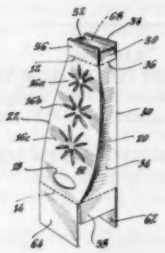
4,166,565

## AIR FRESHENER CARTON

George P. Webinger, Minneapolis, Minn., assignor to Champion International Corporation, Stamford, Conn.

Filed Jun. 8, 1978, Ser. No. 913,904
Int. Cl.[2] A61L *9/04;* B65D *5/36*
U.S. Cl. 229—8 10 Claims



1. A tapered carton made from a blank of foldable sheet material for holding an insert of air freshener material comprising:

a front panel having parallel upper and lower edges and opposite outwardly bowed side edges;

a back panel having parallel upper and lower edges and tapered side edges;

a first side panel connecting one side edge of said front panel to one side edge of said back panel;

a second side panel connecting the other side edge of said front panel to the other side edge of said back panel;

a top closure comprising first and second top side flaps extending from the upper edges of said first and second side panels, a top back flap extending from the upper edge of said back panel and a top front flap extending from the upper edge of said front flap, said top back flap and said top front flap overlapping one another;

a bottom closure comprising first and second bottom side flaps extending from the lower edges of said first and second side panels, a bottom back flap extending from the lower edge of said back panel, a bottom front flap extending from the lower edge of said front panel, said bottom back flap and said bottom front flap being substantially coextensive and being secured to one another in overlapping manner;

said bottom closure having a larger exposed surface then said top closure to form a stable base for said carton.

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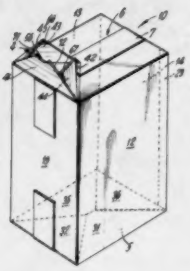
**4,166,566**

## CARTON WITH INTEGRAL RETRACTABLE SPOUT

**Gordon A. Hamilton, Highland Springs, Va., assignor to Champion International Corporation, Stamford, Conn.**

**Filed Mar. 14, 1978, Ser. No. 886,346**
**Int. Cl.[2] B65D 5/72**
**U.S. Cl. 229—17 R** **5 Claims**



1. A blank for forming a rectangular tube like container having a closed base portion, four upstanding wall members including a front and back wall and a first and second sidewall, and a top closure member having a reclosable spout portion, said blank comprising a substantially rectangular substrate of a single or a double wall corrugated paperboard, said substrate including a first side panel having a top and bottom closure flap hingedly connected to the top and bottom edges thereof, said bottom closure flap having a pair of fold lines, each fold line extending from a corner of the bottom closure flap, immediately adjacent said first side panel, to the opposite edge of said bottom closure flap, the fold lines of said bottom closure flap intersecting at a point approximately one half the length of said bottom closure flap; a back panel hingedly connected to said first side panel, said back panel having a top and bottom closure flap hingedly connected to the top and bottom edges thereof; a front panel having top and bottom closure flaps hingedly connected to the top and bottom edges thereof and a glue panel hingedly connected to one lateral edge thereof; a second side panel disposed between and hingedly connected to said front and back panels, said second side panel having top and bottom closure flaps hingedly connected to the top and bottom edges thereof; the top closure flap of said second side panel having a pair of fold lines each of which extends from a corner of said closure flap immediately adjacent said second side panel to an intermediate point of said closure flap, said top closure flap further including a substantially W shaped cut along its top portion, said W shaped cut and said fold lines defining first and second substantially triangular minor tabs and a central substantially triangular insert tab disposed between said minor tabs; one edge of said insert tab being hingedly connected to said second side panel, the second and third edges of said insert tab each being hingedly connected to an edge of one of said minor tabs; said back panel top closure flap having a fold line extending from the corner of said back panel top closure flap, bounded by said back panel and said second side panel, to the free edge of said back panel top closure flap, thus defining an edge of a first triangular major segment, another edge of which is hingedly connected to an edge of said first minor tab, the third edge of which comprises a portion of the free edge of said back panel top closure flap; said front panel top closure flap having a fold line extending from the corner of said front panel top closure flap bounded by said front panel and said second side panel to the free edge of said front panel top closure flap, thus, defining an edge of a second triangular major segment, another edge of which is hingedly connected to said second minor tab, the third edge of said second major segment comprising a portion of free edge of said front panel top closure flap.

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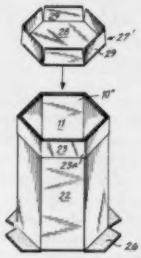
**4,166,567**

## POLYGONAL PAPERBOARD DRUM

**Ralph L. Beach, Jr., Convent Station, N.J., and William R. Fuson, Wilmington, Del., assignors to International Paper Company, New York, N.Y.**

**Continuation of Ser. No. 692,435, Jun. 3, 1976, abandoned. This application Nov. 4, 1977, Ser. No. 848,619**
**Int. Cl.[2] B65D 5/35, 13/00**
**U.S. Cl. 229—23 BT** **6 Claims**



1. A polygonal paperboard container, which comprises:

a one-piece, upstanding, generally tubular, reinforcing member consisting of at least six, foldably connected, substantially rectangular, upstanding, reinforcing flaps, arranged in a row; and

a one-piece body member having two sets of at least three, substantially rectangular, foldably connected, upstanding side wall panels and a polygonal bottom panel of at least four sides, connected along its opposite sides to the central side wall panel of each set of side wall panels;

the sets of side wall panels being located on opposite sides of the tubular reinforcing member and the side wall panels being bonded to the reinforcing flaps;

the upstanding lateral sides of the sets of side wall panels being in substantially abutting relationship but not overlapping about the foldable connection between reinforcing flaps, and the upstanding lateral sides of the reinforcing member being in substantially abutting relationship but not overlapping about the foldable connection between side wall panels; and

a substantially rectangular, body flange being foldably connected to each side wall panel along one side of each set of side wall panels remote from the bottom panel; and

the lateral sides of the body flanges being connected by tabs, so that the lateral sides of the body flanges are connected until the container is to be closed.

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**4,166,568**

## POLYGONAL CONTAINER

**Walter B. Swan, 7030 W. 100th St., Chicago Ridge, Ill. 60415**

**Filed Jun. 19, 1978, Ser. No. 916,587**
**Int. Cl.[2] B65D 13/04**
**U.S. Cl. 229—23 R** **15 Claims**

1. A polygonal container having a container sides assembly and a separate container bottom assembly which is adapted for interlocking engagement with said container sides assembly at the lower portion thereof for forming the container bottom:

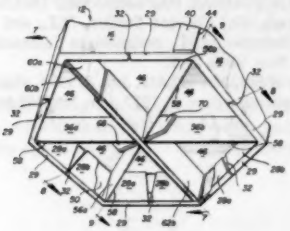
said container sides assembly comprising:

a plurality of generally rectangular side panels hingedly interconnected to form an enclosure defining the sides of the polygonal container;

and a plurality of lower edge flaps hingedly connected to the lower edge of said rectangular side panels and adapted for folding upwardly and inside the enclosure to interlockingly receive corresponding elements from said container bottom assembly; and

said container bottom assembly comprising:

a plurality of generally triangular bottom panels equal in number to said side panels;



a plurality of interconnecting webs, each web foldably disposed between a pair of adjacent triangular bottom panels and downwardly therefrom for disposing adjacent said triangular bottom panels in abutting relationship at two sides of said triangular bottom panels;

a plurality of ear members corresponding to said lower edge flaps on said container sides assembly, each of which ear member is hingedly connected to the third side of a said triangular bottom panel and is downwardly extending therefrom for operative engagement with said lower edge flaps of said rectangular side panels of said container sides assembly to form said polygonal container.

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**4,166,569**

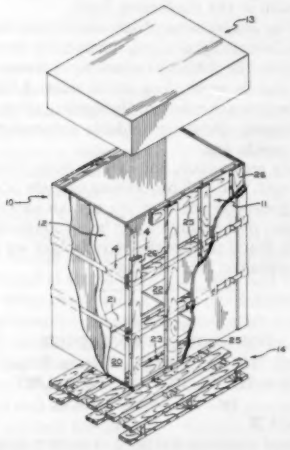
**CONTAINER**

**Edward M. Begnaud, Bay Village, and Benedict C. Birkmeier, Strongsville, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio**

**Filed Feb. 27, 1978, Ser. No. 881,228**

**Int. Cl.[2] B65D** *5/32, 5/44, 5/56*

**U.S. Cl. 229—23 C** **8 Claims**



**1.** A container for the storing and shipping of flowable material comprising an inner corrugated liner for confining the material into a rectangular-shaped mass; said liner having two end panels and two side panels, each of said side panels having a pair of vertically extending corner edges, a top horizontally extending edge and a bottom edge; a rigid side frame member abuttingly engaging each of said side panels; each side frame having at least one brace along each of said edges of said side panels; the braces in each of said respective side frames being interconnected to provide two separate rigid support means; an outer shell encompassing said side frames and said liner; said shell having a bottom surface; said shell having straps disposed internally thereof and extending horizontally around said shell forming support means for said shell; and said straps defining a closed loop of predetermined length.

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**4,166,570**

**PACKAGE WITH HANDLE**

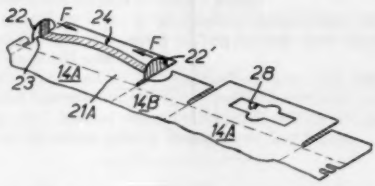
**Jean Lazerand, Rochechouart, and Andre Risbec, Neuilly-sur-Marne, both of France, assignors to Colgate-Palmolive Company, New York, N.Y.**

**Filed Feb. 16, 1978, Ser. No. 878,192**

**Claims priority, application France, Feb. 22, 1977, 7705114**

**Int. Cl.[2] B65D** *25/28, 5/46*

**U.S. Cl. 229—52 B** **6 Claims**




**1.** A paperboard blank suitable for producing a parallel-sided package of the type comprising a longitudinal alignment of four generally quadrangular side panels articulated in succession in pairs by parallel transverse fold lines, at least some of said side panels being extended by closing flaps laterally beyond longitudinal fold lines perpendicular to said transverse fold lines, wherein one of said closing flaps is provided laterally on two opposed edges with ears projecting outwardly from each of said opposed edges beyond a fold line which is substantially perpendicular to the longitudinal fold line of said flap, and a handle strip which is fastened at each of its ends to one of said ears, said strip not being fastened to said one of said closing flaps and lying flat on said one of said closing flaps between said ears.

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**4,166,571**

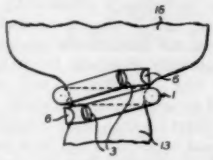
**U-SHAPED SHUT-OFF CLIPS**

**Herbert Niedecker, Am Elierhang 6, Königstein 2, Fed. Rep. of Germany (6240)**

**Filed Feb. 7, 1977, Ser. No. 766,419**

**Int. Cl.[2] B65D** *33/30, 77/10*

**U.S. Cl. 229—65** **9 Claims**



**1.** An open-mouthed container closed by a clip having an over-all uniform cross-sectional area and comprising opposed

limbs interconnected by a web at transitory points, said limbs having a notch cut on the outside of each limb as a pliability-prone segment therein, aiding the bending of each limb toward the other limb away from its respective notch, the clip in its open state being U-shaped, whereby the enclosed container is remote from the notches so as not to be damaged thereby.

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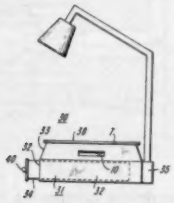
**4,166,572**

## COMBINED TRASH RECEPTACLE FOR TABLE USE

**Winthrop M. ...eds, 212 Overdale Rd., Pittsburgh, Pa. 15221**

**Filed Aug. 8, 1977, Ser. No. 822,537**
**Int. Cl.[2] A24F *19/08*; B65F *1/00***
**U.S. Cl. 232—1 R** **3 Claims**



1. A combined relatively-small portable trash receptacle container (30) for dining-table use comprising, in combination:

(a) means defining a lower-disposed box-shaped rectangular trash-receptacle container having inwardly-sloping side walls adaptable for placing upon a dining-table top and having a hollow interior with an upper-disposed supporting opening (7);

(b) one or more slot openings (10) disposed in said inwardly-sloping side walls of said rectangularly shaped trash-receptacle container (30) for the accommodation of trash items;

(c) a removable open-topped trash-receptacle sliding drawer (34) of rectangular configuration slidable into the lower base portion of said rectangularly shaped trash-receptacle container (30) and removable therefrom;

(d) an upper-disposed substantially cup-shaped cigarette ashtray removable from the upper supporting opening (7) of the trash-receptacle container (30) and serving as the removable lid for the trash receptacle container (30); and,

(e) a permanently attached lamp fixture secured to the rear portion of the aforesaid trash receptacle container (30) and affixed thereto on the side of said rectangularly shaped trash receptacle container opposite from said removable open-topped drawer of rectangular configuration (34) for illuminating purposes.

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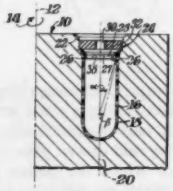
**4,166,573**

## CENTRIFUGE TUBE ENCLOSURE

**Donald A. Webster, Fairfield, Conn., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Dec. 1, 1977, Ser. No. 856,234**
**Int. Cl.[2] B04B *5/02***
**U.S. Cl. 233—26** **8 Claims**



1. In a centrifuge rotor for centrifuging a fluid sample in a flexible sample container subject to cold flow having an open end, said rotor having a rotational axis and a radially spaced cavity, with an open end and an axis through said open end generally parallel to said rotational axis, adapted to receive said container, said open cavity end being flared upwardly and outwardly, a first rigid plug tapered downwardly and inwardly, and a retainer secured to said open cavity end for wedging the walls of the open end of a sample container between said plug taper and said flare, the improvement of:

said plug having an annular groove about its periphery, whereby the combined forces of said retainer and, during operation of said rotor, hydrostatic forces of said fluid sample cause said sample container wall to cold flow into said groove forming a sealing and locking ring for said container that facilitates removal of said plug from the container with reduced disturbance of said fluid sample.

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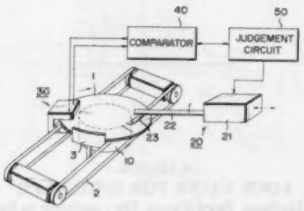
**4,166,574**

## APPARATUS FOR MARKING IDENTIFICATION SYMBOLS ON WAFER

**Masanori Yokoyama, Chigasaki, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Japan**

**Filed May 31, 1978, Ser. No. 911,234**
**Claims priority, application Japan, Jun. 7, 1977, 52-67502; Jun. 7, 1977, 52-67503; Jun. 7, 1977, 52-67504; Jun. 7, 1977, 52-67505; Jun. 7, 1977, 52-67506; Sep. 7, 1977, 52-107504**
**Int. Cl.[2] G06K *17/00*; B01J *17/00*; G06K *7/14, 19/06***
**U.S. Cl. 235—375** **7 Claims**




1. An apparatus for marking identification symbols on a wafer surface comprising: a marking means for marking the identification symbols on the wafer surface; a reading means for reading the marked identification symbols on the wafer surface; a comparing means for making comparison of data of the marked symbols which are read by the reading means with basic data on which said identification symbols are marked on the wafer surface; and a judging means for inspecting and judging from the result of the comparison of the both data whether the identification symbols are correctly marked on said wafer surface.

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**4,166,575**

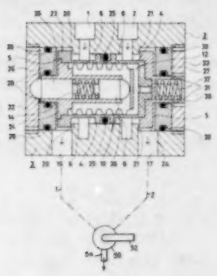
## HOT AND COLD WATER SUPPLY FOR MIXING VALVES

**Kari Sassi, Helsinki, Finland, assignor to Konejukka Oy, Finland**

**Filed May 19, 1977, Ser. No. 798,389**
**Claims priority, application Finland, Oct. 14, 1976, 762947**
**Int. Cl.[2] G05D *11/16***
**U.S. Cl. 236—12 R** **14 Claims**

1. In a system for supplying hot and cold liquid such as water to a mixing valve, hot water conduit means and cold water conduit means extending in the same general direction and situated adjacent each other for respectively supplying hot and cold water to a mixing valve, slide valve means extending across and intersecting both of said conduit means for regulating the flow of water through both of said conduit means, said slide valve means assuming automatically under given pressure and temperature conditions of the water in said hot and cold water conduit means a given position with respect thereto, and

said slide valve means automatically responding to a change in the pressure conditions for automatically moving said slide valve means with respect to said hot and cold water conduit means in a direction tending to eliminate said change, and temperature-responsive means located within said slide valve



means for sensing a change in the average temperature of said hot and cold water prior to mixing thereof and for responding automatically to a change in the temperature conditions of said hot or cold water and for moving said slide valve means with respect to said hot and cold water conduit means in a direction which will eliminate the change in the temperature conditions.

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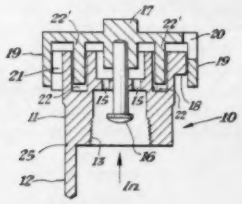
**4,166,576**

## LOCK VALVE FOR SPRINKLER

**Richard J. Harrison, Boca Raton, Fla., assignor to Safe-T-Lawn, Inc., Hialeah, Fla.**

**Filed Oct. 17, 1977, Ser. No. 842,612**
**Int. Cl.[2] B05B *1/30***
**U.S. Cl. 239—11** **2 Claims**



1. In a sprinkler system including at least a two part sprinkler device having one part connected to and relatively movable in relation to said second part and said relatively movable parts provide an adjustable valve means for controlling outflow of fluid between said one part and said second part, comprising:

said one part is a body member having an input end and an output end with side walls around a fluid channel,

said second part is a cover member with side wall portions movable up and down relative to said output end and said side walls,

a frictional locking means including a breakway insertion member removably connected to said one of the two parts,

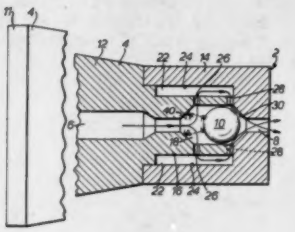
a cavity means positioned between the two parts for inserting after removal said insertion member into said cavity means to wedge lock said valve means in a particular position to prevent movement.

**4,166,577**

## LIQUID INJECTION DEVICE

**Stephen J. Elwell, Romford, England, assignor to Plessey Handel und Investments AG, Zug, Switzerland**

**Filed Apr. 19, 1977, Ser. No. 788,937**
**Claims priority, application United Kingdom, May 4, 1976, 18073/76**
**Int. Cl.[2] B05B *3/14***
**U.S. Cl. 239—102** **9 Claims**



1. A liquid injection device comprising a housing; a liquid bore in the housing; an orifice in the housing for injecting atomized liquid; a liquid chamber connected to and arranged upstream of the orifice; a valve which is normally arranged to close the orifice, the valve being adapted to be moved electrically away from the orifice, and the valve being a close fit in the liquid chamber so that substantially no liquid can pass directly from the liquid bore to the orifice by passing between the valve and the walls of the liquid chamber; an annular liquid passage surrounding the liquid chamber; first passage means for passing liquid from the liquid chamber to the annular liquid passage; and second passage means arranged downstream of the first passage means for passing liquid to the orifice; the liquid injection device being such that when the valve is moved away from the orifice, the liquid in the annular liquid passage passes through the second passage means and is atomized for injection through the orifice and also forces the valve towards the bore whereby as the valve moves towards the bore the size of said first passage means is reduced thereby increasing the force tending to return the valve to the orifice.

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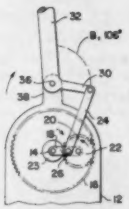
**4,166,578**

## OSCILLATING LAWN SPRINKLER

**Leo Skwara, 646 Bechard Rd., Kelowna, British Columbia, Canada (V1Y 4V8)**

**Filed Mar. 16, 1978, Ser. No. 887,014**
**Int. Cl.[2] B05B *3/16***
**U.S. Cl. 239—242** **3 Claims**



1. An oscillating lawn sprinkler comprising a base, a motor mounted on the base and having a rotor actuated thereby, a crown gear fixed to said base concentrically about said rotor; a pinion gear engaged by said crown gear; a link fixed to the rotor and to an end of which the pinion gear is rotatably mounted; a sprinkling outlet on said base including a rocker arm pivoted on said base and having a lever end integral therewith at a lower end thereof, said arm and said lever end forming an obtuse angle therebetween and a connecting rod pivoted to the lower end of said lever arm and to the perimeter of said

pinion gear whereby said rod continually travels in both an axial direction and in an orbital direction as said pinion gear rotates.

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**4,166,579**

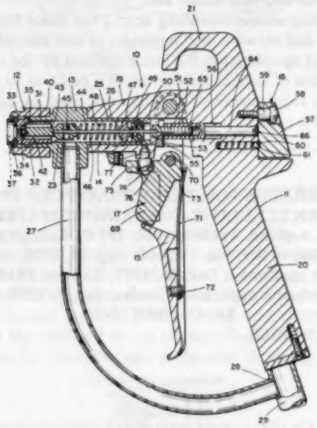
## PAINT SPRAYER SAFETY INTERLOCK

**Theodore W. Beise, Villa Park, and Robert D. Rice, Western Springs, both of Ill., assignors to Stewart-Warner Corporation, Chicago, Ill.**

**Continuation of Ser. No. 721,116, Sep. 7, 1976, abandoned. This application Feb. 13, 1978, Ser. No. 877,533**

**Int. Cl.[2] B05B *7/02***

**U.S. Cl. 239—526** **10 Claims**



**1.** A paint spray gun, comprising, a body having a handle, nozzle means in said body, a valve for controlling the flowing paint to said nozzle means, a reciprocating operator for said valve, a lever mounted on said body for reciprocating said operator, a safety device for preventing movement of said operator including a safety element on said body movable between first and second positions and pivotally mounted on said body above the handle on an axis spaced from the axis of the operator so that it may be thumb operated, and said safety element having an aperture therein facing said body for receiving a portion of said operator when the element is in said second position.

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**4,166,580**

## DRIP IRRIGATION APPARATUS

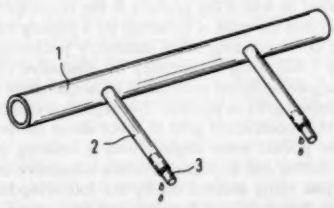
**Walter Meckel, Schulgraben, Fed. Rep. of Germany, assignor to Elisabeth Christine Meckel, Schulgraben, Fed. Rep. of Germany**

**Filed Jun. 29, 1977, Ser. No. 811,237**

**Claims priority, application Fed. Rep. of Germany, Jul. 19, 1976, 2632405**

**Int. Cl.[2] F16K *51/00***

**U.S. Cl. 239—542** **10 Claims**




**1.** A drip-forming device for drip irrigation apparatus, said drip forming device comprising a narrow tube member having a smooth internal surface and a smooth surfaced rod having one end inserted into the tube by an adjustable amount, said rod member being formed with at least one longitudinal groove which extends along at least part of the length of the member and which is in communication with the part of the interior of the tube not occupied by said rod, the depth of said groove decreasing progressively away from the said one end over at least part of the length of the groove said smooth surfaced rod having an external surface dimension of sufficient size that it frictionally engages the smooth internal walls of said narrow tube member to frictionally retain said rod at any axial position in said tube.

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**4,166,581**

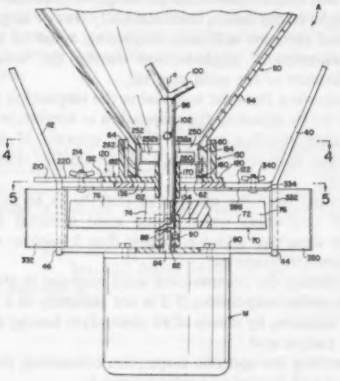
## SPREADER FOR PARTICULATE MATERIAL

**Vernon L. Hetrick, Fairview Park, Ohio, assignor to Meyer Products, Inc., Cleveland, Ohio**

**Filed Feb. 3, 1978, Ser. No. 874,806**

**Int. Cl.[2] E01C *19/20***

**U.S. Cl. 239—683** **23 Claims**



**1.** In a vehicle mounted device for spreading particulate material, said device comprising an upper hopper having a lower material discharge chamber terminating in a lower discharge opening a spreader element; motor means for rotating said spreader element about a generally vertical axis in a first rotational direction whereby material discharged from said opening onto said spreader element is centrifugally propelled from said element; and, valve means between said discharge chamber and said spreader element for controlling flow of said material from said chamber to said spreader element, said valve means having a first valve member, a second valve member and means for selectively shifting said valve members with respect to each other between a valve opened position allowing discharge of said material onto said spreader element and a valve closed position preventing discharge of said material onto said spreader element, the improvement comprising: said shifting means including a driven coupling member in said chamber and secured to said first valve member; a driving coupling member rotatably mounted in said chamber, means for spacing said coupling members in said chamber to create a driving force through particulate material in said chamber and between said coupling members as said driving coupling member is rotated, means responsive to said motor means rotating in said first rotational direction for rotating said driving coupling member in a first direction creating a force on said driven coupling member tending to move said driven coupling member and said first valve member into the valve opened position, means responsive to said motor means rotating in a second direction opposite to said first direction for rotating said driving coupling member in a second direction creating a force on

said driven coupling member tending to move said driven coupling member and said first valve member into the valve closed position, and means for selectively changing the direction of rotation of said motor means.

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**4,166,582**

## COMMINUTION OF MATERIALS

**Hugh R. Falcon-Steward, Cornwall, England, assignor to English Clays Lovering Pochin & Company Limited, Cornwall, England**

**Filed Dec. 28, 1977, Ser. No. 865,242**
**Claims priority, application United Kingdom, Jan. 19, 1977, 2185/77**
**Int. Cl.[2] B02C *23/18***
**U.S. Cl. 241—16** **13 Claims**

1. A method of comminuting a solid material comprising calcium carbonate to obtain a comminuted solid material containing at least 60% by weight of particles smaller than 2 microns equivalent spherical diameter, which method comprises the steps of:

(a) forming an aqueous suspension of the solid material which has a solids content in the range of from 5% to 50% by weight of dry solids, is substantially free of large particles, and contains sufficient dispersing agent to prevent the formation of agglomerates during the subsequent comminution of the solid maerial;

(b) comminuting the solid material in the suspension formed in step (a) by agitating the suspension in admixture with a particulate grinding medium which consists of particles not larger than about 10 mm and not smaller than about 0.15 mm;

(c) separating from the product of step (b) an aqueous suspension containing comminuted solid material at least 60% by weight of which is smaller than 2 microns equivalent spherical diameter;

(d) flocculating the comminuted solid material in the separated aqueous suspension, if it is not presently in a flocculated condition, by means of an electrolyte having a multivalent cation; and

(e) dewatering the aqueous suspension containing the comminuted and flocculated solid material.

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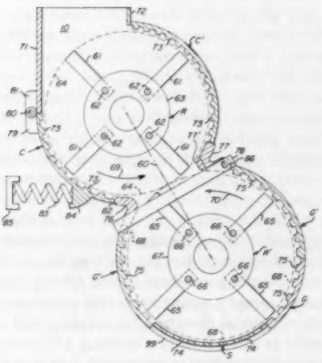
**4,166,583**

## HAMMERMILL

**Konrad Ruckstuhl, 1019 E. Easter Way, Littleton, Colo. 80122**

**Filed Nov. 23, 1977, Ser. No. 854,245**
**Int. Cl.[2] B02C *13/284, 13/286***
**U.S. Cl. 241—73** **25 Claims**



1. A hammermill construction comprising:

first and second rotors, each having hammers and at least said first rotor having pivoted hammers, the ends of said hammers, when extended or fixed during rotation describing a circle of a predetermined radius for each of said rotor;

means for supporting said rotors for rotation in the same direction about parallel horizontal axes but with the axis of the first rotor at a higher elevation than the axis of the second rotor, with a line between said axes being an acute angle to the horizontal and said axes being spaced apart along said line a distance greater than the sum of the radius of each said circle to prevent a hammer of one rotor from directly striking a radially opposite hammer of the other rotor but to permit a hammer of one rotor to strike a piece propelled by a hammer of the opposite rotor;

means for feeding objects or articles to be ground or subdivided to said first rotor; and

intercepting means extending across the space between said rotors and between said hammers of said second rotor at a position spaced from the circle defined by the ends of the hammers of said first rotor but in a position to receive an impact from pieces or objects propelled by hammers of said first rotor.

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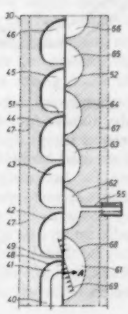
**4,166,584**

## APPARATUS FOR PRODUCING PULP FROM LIGNOCELLULOSE-CONTAINING MATERIAL

**Arne J. A. Asplund, Tykövägen 20, 181 61 Lidingö 3, Sweden**

**Continuation of Ser. No. 717,644, Aug. 25, 1976, abandoned. This application Dec. 23, 1977, Ser. No. 863,662**
**Claims priority, application Sweden, Sep. 5, 1975, 7509904**
**Int. Cl.[2] B02C *7/12***
**U.S. Cl. 241—261.3** **4 Claims**



1. In a grinding apparatus for producing grist from ligno-cellulose material in which the material is ground in a straight grinding space (h) defined between a rotating disc (**12**) and a stationary disc (**16**) arranged within a housing (**10**), each of the discs comprising a plurality of substantially parallel radial bars (**47, 67**) and interconnecting transverse ribs (**51, 52**) defining a plurality of radially disposed pockets having a curved profile in cross section, the pockets in one of the discs being offset radially relatively to the pockets in the other disc to form a sinuous uninterrupted passage for the grist as it is propelled radially outwards in the grinding space by centrifugal force; the improvement in which the pockets in the respective discs are profiled so that the grist is deflected by a passing rotating pocket into a corresponding offset stationary pocket and retained therein while being compressed by successive charges of grist to a degree sufficient to develop frictional stress forces within the retained grist to promote disintegration thereof and to cause the thus compacted grist to pivot about the profiled surface of the pocket until aligned with a rotating pocket wherein it is fluffed and accelerated into a successive stationary pocket upon being sheared off by the following bar, the grinding space being defined between the free edges of the radial bars (**47, 67**) which extend outwardly the full depth of the pockets to the grinding space and the transverse ribs (**51,**

52), which radial bars and transverse ribs are located in two mutually spaced planes.

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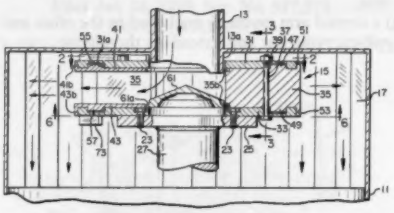
**4,166,585**

## IMPACT CRUSHER TABLE CONSTRUCTION

**Peter B. Alford, Cheshire, and David F. Peaks, Eugene, both of Oreg., assignors to El-Jay, Inc., Eugene, Oreg.**

**Filed Dec. 9, 1977, Ser. No. 858,812**
**Int. Cl.[2] B02C *19/00***
**U.S. Cl. 241—275** **10 Claims**



1. A rotary distributor table for an impact crusher comprising upper and lower table plates,

plural impeller shoes between said table plates,

said table plates having elongate grooves formed therein extending coaxially of said table,

each shoe having upper and lower integral retaining lugs fitting in said grooves for retaining said shoes in place against the outward thrust of centrifugal force,

and means for clamping said plates and shoes together.

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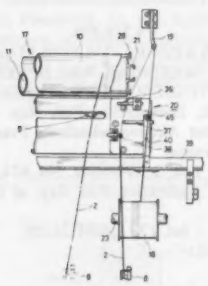
**4,166,586**

## YARN WINDING METHOD AND APPARATUS

**Katuo Shirasuna; Ichiro Kumo; Teruo Kobayashi, and Shigeo Ohno, all of Mishima, Japan, assignors to Toray Industries, Inc., Tokyo, Japan**

**Filed May 18, 1978, Ser. No. 907,337**
**Int. Cl.[2] B65H *54/02, 67/00***
**U.S. Cl. 242—18 PW** **2 Claims**



1. A yarn winding method comprising the steps of (a) shifting a thread line of a yarn running to a full bobbin to the outside of a yarn-traversing width and introducing the yarn to a rotating auxiliary winding roller disposed separately from the full bobbin to wind the yarn on said auxiliary winding roller, (b) stopping travelling of the yarn and rotation of the auxiliary winding roller, (c) taking out the full bobbin from a winder and attaching an empty bobbin to the winder, (d) rotating the auxiliary winding roller in the reverse direction to unwind the yarn therefrom, and forming a yarn-setting thread line adjacent the empty bobbin, (e) starting travelling of the yarn, rotation of the auxiliary winding roller in the normal direction and rotation of the empty bobbin, and (f) shifting the yarn setting thread line within the yarn-traversing width and into engagement with the empty bobbin to start winding of the running yarn onto the empty bobbin.

2. A yarn winding apparatus which comprises (a) a supporting arm on which a bobbin is dismountably and rotatably supported, (b) a rotating and driving element for rotating the bobbin, (c) a traversing element for traversing a running yarn fed to the bobbin over a yarn traversing width, (d) a traverse fulcrum guide for forming a traverse fulcrum for the traversed yarn, (e) a moving element for shifting the traverse fulcrum guide to the outside of said yarn-traversing width, (f) an auxiliary winding roller located at a position where the auxiliary winding roller can catch the yarn conveyed by the traverse fulcrum guide when the traverse fulcrum guide is shifted to the outside of the yarn-traversing width, (g) a rotating means comprising an element for rotating the auxiliary winding roller in the yarn-winding normal direction and an element for rotating the auxiliary winding roller in the reverse direction, (h) a detour guide for forming a thread line for setting to the bobbin the yarn extended from the auxiliary winding roller to the traverse fulcrum guide located outside the yarn-traversing width, by taking out the yarn from the auxiliary winding roller, and (i) a yarn-setting thread line-forming guide means for preventing the yarn on said yarn-setting thread line from falling in contact with the auxiliary winding roller at a point different from the yarn take-up point when it shifts the yarn on said yarn-setting thread line toward and into engagement with the bobbin.

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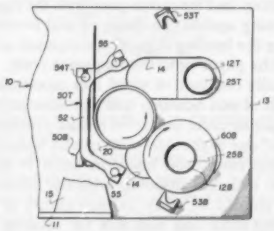
**4,166,587**

## METHOD AND APARATUS FOR TRANSFERRING YARN ON A NEARLY FULL PACKAGE TO AN EMPTY BOBBIN

**Harry B. Miller, Charlotte, N.C., assignor to Industrie-Werke Karlsruhe Augsburg Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Jun. 1, 1978, Ser. No. 911,777**
**Int. Cl.[2] B65H *54/02, 67/04***
**U.S. Cl. 242—18 A** **21 Claims**



1. A method of transferring a yarn or the like, being cross-wound by traverse means into a yarn package, on a substantially full bobbin mounted on a first chuck, and rotated at high speed by a drive roll with the yarn passing between the drive roll and the yarn package, to an empty bobbin, mounted on a second chuck arranged in spaced parallel relation to the first chuck, and initially disengaged from the drive roll, without loss of yarn speed and tension and with little or no waste of yarn, said method comprising the steps of engaging the empty bobbin with the drive roll for high rotation by the drive roll; moving the substantially completed yarn package, still rotating at a high speed, out of engagement with the drive roll to leave a space, between the yarn package and the drive roll, traversed by the yarn; engaging the yarn traversing such space to draw a loop of yarn toward the empty bobbin; while the loop is being drawn, reengaging the yarn package with the drive roll for continued rotation at high speed by the drive roll to maintain tension on the loop of yarn being drawn; disengaging the yarn from the traverse means to interrupt said cross-winding for linear feeding of the yarn to the yarn package rotated at a high speed, while drawing the yarn loop against and beyond the empty bobbin; guiding the yarn loop, while thus being

drawn, axially of the empty bobbin and into alignment with the starting end of the empty bobbin, for catching and severing of the yarn being fed to the completed yarn package and winding of the yarn on the empty bobbin; and reengaging the yarn in the traverse means for cross-winding of a new yarn package on the previously empty bobbin.

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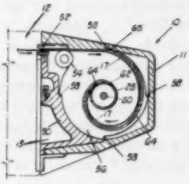
**4,166,588**

## SELF-THREADING TAKE-UP MAGAZINE FOR A PHOTOGRAPHIC PRINTER

**Vivian D. Krehbiel, and Roger L. Marvin, both of Wichita, Kans., assignors to Kreonite Inc., Wichita, Kans.**

**Filed Sep. 11, 1978, Ser. No. 941,064**
**Int. Cl.[2] B65H *17/02*; G03B *17/04, 17/26***
**U.S. Cl. 242—67.1 R** **9 Claims**



1. A self-threading take-up magazine for attaching to a printer head of a photographic printer, the magazine receiving exposed photographic print paper and automatically rolling up the print paper therein, the magazine comprising;

a light tight magazine housing having side walls and adapted for receipt on the printer head and receiving the print paper therein;

a magazine core rotatably mounted on the side walls inside said housing;

a flat flexible paper guide sheet, one edge of said sheet attached to said magazine core, said sheet extending outwardly from said magazine core with the opposite edge of sheet resting against the inside of said housing, said sheet receiving the leading edge of the exposed print paper and guiding the paper onto the magazine core;

an electrically conductive metal disk mounted in one of the side walls of said housing, said disk attached to one end of said magazine core; and drive means positioned beside the outside of one of the side walls of said housing for rotating a magnetic rotor, said magnetic rotor in axial alignment with said disk and disposed adjacent thereto, when said rotor is rotated an eddy current clutch is produced between said rotor and said disk for rotating said disk and winding the print paper on said core.

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**4,166,589**

## PORTABLE WRAPPING FILM DISPENSER

**Lawrence E. Hoover, Clearwater, Fla., and George J. Reid, 2370 17th St., Cuyahoga Falls, Ohio 44223, assignors to George J. Reid, Akron, Ohio**

**Filed Mar. 24, 1978, Ser. No. 889,636**
**Int. Cl.[2] B65H *23/06*; B44C *7/00***
**U.S. Cl. 242—75.4** **14 Claims**

1. A portable device for dispensing wrapping film from a roll comprising:

(a) a roll-carrying bar;

(b) a pair of roll plugs rotatably disposed on said bar, each plug comprising:

(1) a first inner roll end insertion portion adapted to fit into the end of the roll to concentrically engage the inside surface thereof;

(2) a second roll end abutting portion attached thereto of greater diameter than the inside diameter of the roll, adapted to abut the end of the roll; and,

(3) a flat outer surface formed on the outboard surface of said plug perpendicular to the axis of said roll-carrying bar;

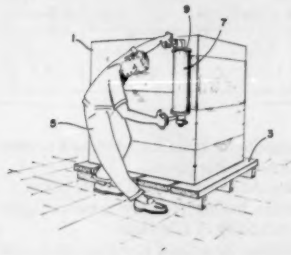
(c) a pair of pins extending from said second roll end abutting portion toward the roll for penetration into the end of the cardboard roll to hold the roll in mating engagement with said plugs;

(d) a sleeve slideably received on one end of said roll-carrying bar and held thereon with a nut threadably received on said bar end;

(e) a first arm extending from said sleeve;

(f) a cross handle extending from the free end of said first arm;

(g) a second arm pivotally anchored to the other end of said roll-carrying bar and extending therefrom;



(h) a cross handle extending from the free end of said second arm;

(i) a brake cam formed on said second arm adapted to contact said flat outer surface of said adjacent plug; and,

(j) at least one friction-producing, compressible washer slidably received on said bar between said second arm mounting sleeve and said flat outer plug surface of said adjacent roll plug to provide increased rotational friction between the roll and said cross handles when squeezed between said sleeve and said outer plug surface upon said brake cam being rotated into contact with said flat outer surface of said adjacent roll plug by twisting said cross handle attached thereto.

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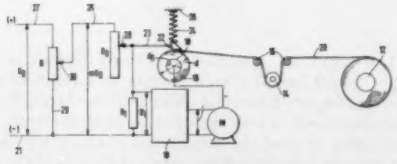
**4,166,590**

## PROCESS AND APPARATUS FOR MAINTAINING A CONSTANT MATERIAL WEB SPEED DURING WINDING OPERATIONS

**Werner Dennhardt, Taunusstein, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Feb. 2, 1978, Ser. No. 874,627**
**Claims priority, application Fed. Rep. of Germany, Feb. 4, 1977, 2704610**
**Int. Cl.[2] B65H *23/20***
**U.S. Cl. 242—75.51** **10 Claims**



1. A process for maintaining a constant material web speed during winding of a material onto a roll driven by a voltage controlled drive motor having an adjustable speed, comprising:

a. adjusting the speed of said drive motor of said roll to be linearly proportional to its control voltage; and

b. as the diameter of the roll increases due to the winding of

said material thereon, reducing the speed of said drive motor by measuring the increase in the diameter of said roll and hyperbolically decreasing the control voltage of said drive motor as a function of said increase in roll diameter.

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**4,166,591**

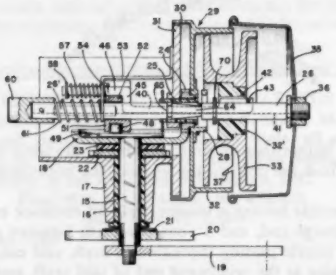
**LEVEL WIND FOR FISHING REEL**

**Bob G. Shepherd, West Columbia, S.C., assignor to Shakespeare Company, Columbia, S.C.**

**Filed Jul. 24, 1978, Ser. No. 927,572**

**Int. Cl.[2] A01K *89/01***

**U.S. Cl. 242—84.21 A** **12 Claims**



1. In a fishing reel having a spool shaft and a spool non-rotatable and axially slidable thereon, a flyer rotatable on said shaft behind said spool, a housing, and drive gear means in said housing directly connected to said flyer, a level wind drive block eccentrically connected to said drive gear, a key axially slidable in said shaft connected to said drive block and said spool whereby rotation of said drive gear reciprocates said spool, spring means biasing said spool rearwardly, and spring means biasing said spool shaft rearwardly.

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**4,166,592**

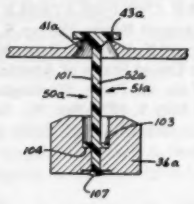
**SEAT BELT RETRACTOR**

**Edward L. Barcus, Flossmoor, Ill., and Louis J. Romanzi, Milford, Mich., assignors to Gateway Industries, Chicago, Ill.**

**Filed Oct. 3, 1975, Ser. No. 619,240**

**Int. Cl.[2] A62B *35/02*; B65H *75/47***

**U.S. Cl. 242—107.4 A** **3 Claims**



1. A seat belt retractor for vehicles comprising a support, a reel having a safety belt thereon mounted for rotating on said support in a first direction to wind the belt on the reel and for turning in the opposite direction with unwinding of the belt from the reel, means biasing said reel to rotate in a direction to wind said belt thereon, a ratchet means connected to said reel to rotate therewith and having a plurality of teeth thereon, said teeth having an inner abutment wall and an outer tooth end, a pawl means having a nose for engagement with said teeth on said ratchet means and movable from an inoperative position spaced from said ratchet means to a blocking position to engage an abutment wall on a ratchet tooth and to block the rotation of said reel and to block unwinding of the belt from said reel, an actuating means having an inertia weight for actuating said pawl means toward said blocking position, said actuating means including a one-piece plastic shaft having a lower end connected to said weight and having an integral plastic upper end constituting an enlarged control cam member to pivot said pawl means, an apertured plate on said support having an aperture through which extends said plastic shaft with said integral plastic control cam member on the upper side of said apertured plate and said weight on the lower side of said plate, said inertia weight having a substantially vertically extending bore therethrough, means on said plastic shaft for engaging said inertia weight to prevent the sliding of the inertia weight upwardly along said shaft and means connected to said plastic shaft at the lower side of said weight for preventing said weight from sliding down and from said shaft, said plastic shaft bending when said pawl means hits an outer tooth end and storing potential energy and converting the same to shift said pawl means to said blocking position.

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**4,166,593**

**CASSETTE HOUSING WITH INTEGRAL TAPE GUIDE**

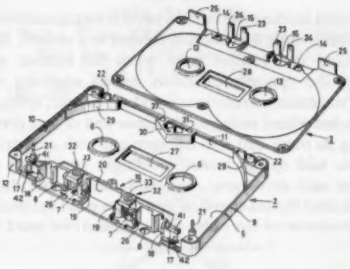
**Lodewijk L. Milants, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Jan. 30, 1978, Ser. No. 873,139**

**Claims priority, application Netherlands, Jan. 31, 1977, 7700972**

**Int. Cl.[2] G03B *1/04***

**U.S. Cl. 242—199** **3 Claims**



1. A housing for a magnetic tape cassette consisting of a lower part and a cover,

the lower part being a unitary mass of synthetic resin material having a bottom, a rear wall and two side walls extending upwardly generally perpendicular to the bottom, at least two cassette locating surfaces on the exterior of the bottom, and a tape guide unit.

the tape guide unit being a continuous section of material extending between and including two true cylindrical tape guides, said tape guides having upper and lower shoulders for vertical positioning of tape passing over the guides, said section also including two upper cassette locating surfaces,

said upper and lower locating surfaces defining upper and lower support planes repectively, parallel to each other, said upper and lower shoulders lying in respective planes parallel to said support planes.

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**4,166,594**

**VARIABLE DRIVE CLUTCH FOR FISHING REEL**

**John O. Kinsey, Fayetteville, Ark., assignor to Shakespeare of Arkansas, Inc., Fayetteville, Ark.**

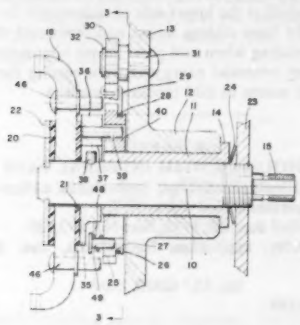
**Filed Feb. 19, 1976, Ser. No. 659,332**

**Int. Cl.[2] A01K *89/02***

**U.S. Cl. 242—214** **1 Claim**

1. A variable drive clutch for a fishing reel having a crank shaft and a drive gear having axially extending exterior drive pins and journaled on said shaft, a non-reverse ratchet wheel journaled on said shaft, a ratchet pawl engaging said ratchet

wheel to permit rotation thereof in one direction and to limit reverse rotation, a drive pawl pivoted intermediate its ends on said ratchet wheel for engaging said drive gear drive pins, a drive arm having a hub secured to said shaft, and adapted to hold said drive pawl in positive driving engagement with said drive gear when the shaft is rotated in one direction, a pin on said arm and a slot in said ratchet wheel movably receiving said pin for permitting limited rotation of said arm relative to said ratchet wheel between positions engaging and disengaging the drive arm and the drive pawl, and a spring encircling the



ratchet wheel holding the ratchet pawl in engagement with the ratchet wheel when the wheel is rotated in a reverse direction and releasing said ratchet pawl when the ratchet wheel is rotated in the opposite direction, means applying variable frictional resistance to rotation of said drive gear, spring means on the ratchet wheel engaging the inner end of said drive pawl for biasing its outer end into engagement with said drive gear drive pins, said spring means yieldingly permitting reverse rotation of said drive gear, and said hub on the drive arm adapted to abut the inner end of said drive pawl for limiting the biased movement of the outer end of said drive pawl.

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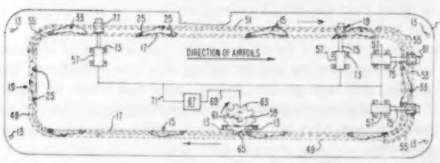
**4,166,595**

## VARIABLE LIFT ADVANCING WING AIRCRAFT

**Alvino J. Ango, 1252 Elliott St., Madison Heights, Mich. 48071**

**Filed Mar. 30, 1978, Ser. No. 891,699**
**Int. Cl.[2] B64C *39/00***
**U.S. Cl. 244—20** **20 Claims**




**20.** A rapid-lift airfoil-driven aircraft comprising an airframe supporting a cargo compartment, a plurality of spaced apart airfoils movably disposed peripherally along and around the top, front, bottom and rear sides of said airframe exteriorly of said cargo compartment, means for drivably moving said airfoils in a predetermined direction around said airframe, whereby to provide forward thrust to said aircraft as said airfoils are driven past the front side perimeter thereof, and means for expansibly and retractably altering the plano-convex profiles of said airfoils as said airfoils are driven past the top side and front side perimeters thereof, whereby to vary the lift and forward thrust of said aircraft respectively, optimum elevational expansion of said airfoils when driven past the top side perimeter thereof serving to maximum the lift of said aircraft, and optimum elevational expansion of said airfoils when driven past the front side perimeter thereof serving to maximize the forward thrust of said aircraft.

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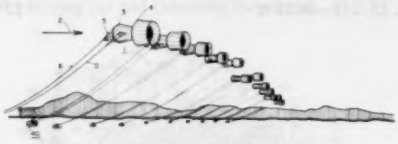
**4,166,596**

## AIRSHIP POWER TURBINE

**William J. Mouton, Jr., Box 10515, New Orleans, La. 70181, and David F. Thompson, 2540 Green St., Chester, Pa. 19013**

**Continuation-in-part of Ser. No. 764,251, Jan. 31, 1978, abandoned. This application Apr. 28, 1978, Ser. No. 901,161**
**Int. Cl.[2] B64B *1/02, 1/50*; F03D *9/00***
**U.S. Cl. 244—30** **12 Claims**



**1.** In a lighter-than-air craft tethered in the wind by a tether leading from the craft to the ground, the improvement comprising

(a) a nozzle having a tubular wall, an entrance end, and a discharge end, and a vena contracta between said ends, said nozzle passing through said craft, said entrance end opening at the windward end of said craft, and said discharge end opening at the leeward end of said craft, whereby wind is intercepted and guided through said nozzle, said nozzle having at the vena contracta an annular recess in its tubular wall,

(b) annular bearing structure mounted in said recess,

(c) turbine wheel means comprising at least one turbine wheel carried on said bearing structure coaxial within said nozzle for rotation by the intercepted wind,

(d) an endless cable drive in the form of at least one elongated loop of cable extending from the craft to the ground,

(e) electrical energy generation means comprising a generator on the said ground,

(f) sheave means drivingly coupling each turbine wheel to the endless cable drive, and

(g) other sheave means on the ground drivingly coupling the endless cable drive to the said energy generation means.

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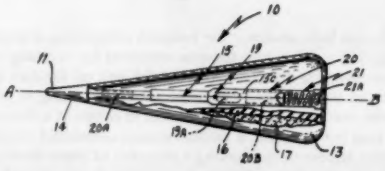
**4,166,597**

## STOWABLE AND INFLATABLE VEHICLE

**Clair F. Seifert, Newport Beach; Harvey S. Seapy, Manhattan Beach, and Thorvald K. Petersen, Santa Monica, all of Calif., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed May 9, 1974, Ser. No. 468,702**
**Int. Cl.[2] B64G *1/00***
**U.S. Cl. 244—160** **7 Claims**



**1.** A stowable and inflatable decoy space vehicle, having a fore end, an aft end, and a longitudinal axis, adapted for use as a replica of a relatively hot parent space vehicle, comprising:

a. an outer covering of woven carbon cloth;

b. a rigid nose tip disposed at the fore end of the decoy space

vehicle and external of, and connected to, said outer covering;

c. an inflatable liner internal of said outer covering;

d. a heater blanket interposed between said outer covering and said inflatable liner;

e. an extendable and a collapsable tube centrally located within the decoy space vehicle, in registration with said longitudinal axis of the decoy space vehicle, and extending from said fore end of the decoy space vehicle to said aft end of the decoy space vehicle, with said tube having a first end and a second end, wherein said first end interfaces with said rigid nose tip;

f. means, internal of said outer covering, for inflating said inflatable liner;

g. means, internal of said outer covering, for heating said heater blanket;

h. and, means, internal of said outer covering, for extending and for collapsing said extendable and collapsable tube.

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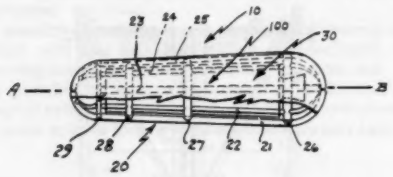
**4,166,598**

## VEHICLE ENSHROUDING APPARATUS

**Clair F. Seifert, Newport Beach; Harvey S. Seapy, Manhattan Beach, and David E. Dunlap, Mission Viejo, all of Calif., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed May 30, 1974, Ser. No. 474,479**
**Int. Cl.[2] B64G *1/00***
**U.S. Cl. 244—160** **5 Claims**




1. A stowable apparatus for enshrouding a large, relatively hot space vehicle, comprising:

a. an inflatable frame which includes:

(1) a plurality of inflatable tubular-shaped longitudinal members in spaced-apart relationship;

(2) and, a plurality of inflatable toroidal-shaped members in spaced-apart relationship;

wherein each of said plurality of inflatable toroidal-shaped members is positioned essentially perpendicular to, and in contact with, each of said plurality of inflatable tubular-shaped longitudinal members;

b. and, a multilayer thermal superinsulating blanket shroud external of, and attached to, said inflatable frame.

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**4,166,599**

## WAYSIDE ORIENTED MOVING BLOCK

**John H. Auer, Jr., Fairport, and Frank A. Svet, Jr., Churchville, both of N.Y., assignors to General Signal Corporation, Stamford, Conn.**

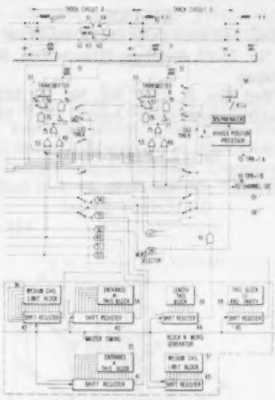
**Filed Jun. 21, 1977, Ser. No. 808,745**
**Int. Cl.[2] B61L *3/20, 27/00***
**U.S. Cl. 246—63 A** **31 Claims**

1. Apparatus for the transmission of traffic control information to vehicles travelling in one direction on a guideway wherein said guideway comprises a plurality of sequentially coupled blocks comprising:

a plurality of vehicle detecting means each associated with a different block for detecting the presence of a vehicle in said associated block,

transmitting means associated with each block for providing traffic control information to a vehicle in said block, and,

information selecting means coupled to said transmitting means and coupled to each said vehicle detecting means, said information selecting means coupling to each said transmitting means information identifying the next adja-



cent downstream unavailable block regardless of the number of clear blocks between said transmitting means and said unavailable block.

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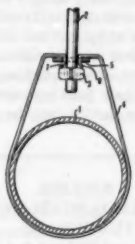
**4,166,600**

## PIPE HANGERS

**Raymond Perjes, 77 rue d'Enghien A6, Epinay, France (93800)**

**Filed Aug. 11, 1977, Ser. No. 823,849**
**Int. Cl.[2] F16L *3/14***
**U.S. Cl. 248—59** **11 Claims**



1. A pipe hanger for suspending a conduit from a threaded rod, the hanger comprising, in combination:

a flat strip which is bent at both its ends to form first and second folds in spaced relationship with each other adjacent each end, each of said ends including a portion which extends in a horizontal plane in the normal position of use of the hanger;

buckle means having a central cut-out for receiving the threaded rod and the ends of said flat strip;

nut means threaded on said rod to clamp the horizontal portion of each of said ends of said strip between said nut means and said buckle means, the weight of the conduit compressing each of said horizontal portions to firmly clamp the same between the buckle means and the nut means;

said buckle means being located above the said nut means in the normal position of use of the hanger, and said ends of said strip running up over the top of the said buckle means on the outside and descending into said central cut-out against said threaded rod and being finally compressed between said buckle means and said nut means, whereby the greater the weight of the supported pipe, the greater is

the compression exerted by said strip on its own ends via said buckle means.

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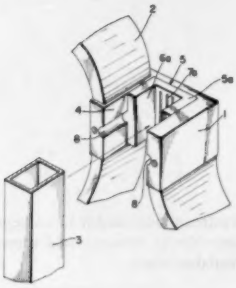
**4,166,601**

## MOUNTING MEANS FOR DECORATIVE DEVICE

Chizuo Kato, No. 25-12, 2-chome, Higashi-Ohi, Shinagawa-ku, Tokyo-to, Japan

Filed Nov. 14, 1977, Ser. No. 851,302
Claims priority, application Japan, Apr. 15, 1977, 52-47349[U]
Int. Cl.[2] F16M *13/00*
U.S. Cl. 248—226.3 2 Claims



1. Mounting means for a decorative device comprising a U-shaped holder having an opening at one side of said holder, said holder being formed integral with the decorative device, a cover adapted to be releasably joined to said holder for covering the opening, a two-split packing means made of metal and consisting of two packing halves having an outer configuration so that they may be removably snugly fitted into said holder and an opening with a cross sectional configuration adapted to be snugly fitted over a support, and matching convex and concave portions provided on the wall surfaces of said holder and on the outer surfaces of said packing means for interconnecting said holder and said packing means into a single unit, whereby said decorative device may be securely attached to said support.

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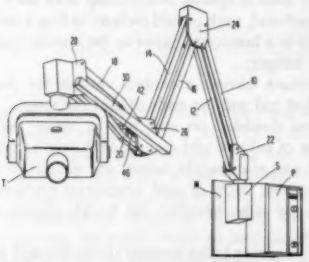
**4,166,602**

## COUNTERBALANCING MECHANISM FOR X-RAY TUBEHEADS

Carl G. Nilsen, Lincroft, and Richard A. Gabel, Livingston, both of N.J., assignors to Pennwalt Corporation, Philadelphia, Pa.

Filed May 18, 1978, Ser. No. 907,226
Int. Cl.[2] B66D *1/00*; A47F *5/00*
U.S. Cl. 248—280.1 6 Claims



1. In an extensible and adjustable X-ray arm carrying an X-ray tubehead at an outer end thereof, said X-ray arm including a linkage assembly articulating successively between each of a knuckle assembly, triangle assembly, cam housing assembly, and trunnion assembly, said tubehead communicating with said trunnion assembly and having wide weight and inertia variations, the combination therewith of the improvement for precisely counterbalancing said tubehead by means of a single adjustment, said counterbalancing being achieved by a counterbalance mechanism devoid of cams, chains and springs and comprising

a hollow structural member pivotally connected at upper end portions thereof to said cam housing assembly and trunnion assembly,

a gas spring disposed at a lower portion of said hollow structural member, said gas spring including a cylinder and a piston rod,

means within said hollow structural member for pivotally mounting said cylinder proximal to pivotal connection of said structural member to said trunnion assembly, and

other means within said structural member for moving outer end of said piston rod in a direction substantially normal to axis of said gas spring for changing resisting moment arm to counterbalance said tubehead.

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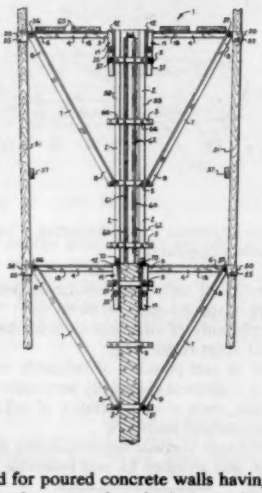
**4,166,603**

## SCAFFOLD FOR POURED CONCRETE WALLS AND FORMS

Edward B. Ward, 820 Winchester, Kansas City, Mo. 64125

Filed Feb. 28, 1978, Ser. No. 882,102
Int. Cl.[2] E04G *11/28*
U.S. Cl. 249—20 14 Claims



1. A scaffold for poured concrete walls having at least two vertically spaced rectangular tie bars projecting laterally therefrom, said scaffold comprising:

(a) a rigid support arm having a first end, and a second end shaped for detachable connection with one of said tie bars; said support arm second end including first and second opposing flanges spaced apart a distance substantially commensurate with the thickness of said tie bars, and forming a rectangularly shaped slot therebetween to receive one of said tie bars therein for securely attaching the support arm to the tie bar and stabilizing the scaffold against pivoting; said support arm being adapted for extending horizontally from said wall and supporting a weight thereon;

(b) an angle brace having a first end thereof connected with said support arm first end, and a second end adapted for detachable connection with another one of said tie bars; said angle brace being positioned at an acute angle with respect to said support arm, and retaining the same in a generally, substantially horizontal orientation.

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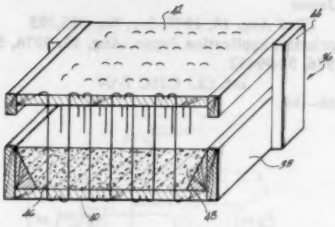
## MOLD FOR FABRICATING A SPARGER PLATE

Jonathan A. Dantzig, New Haven; Derek E. Tyler, Cheshire, and Richard C. Milici, Madison, all of Conn., assignors to Swiss Aluminium Ltd., Chippis, Switzerland

Filed Feb. 3, 1978, Ser. No. 874,867
Int. Cl.[2] B22B 7/28; C22B 21/06
U.S. Cl. 249—122 3 Claims



1. A mold for use in the casting of a ceramic to produce a sparger plate utilized in the degassing of molten metal with a fluxing gas, said sparger plate being characterized by an array of holes of controlled size and spacing so as to eliminate fluxing gas bubble coalescence comprising in combination:

(1) a base plate;

(2) side wall means secured to said base plate so as to form an enclosure;

(3) a plurality of securing means of controlled spacing associated with said base plate within said enclosure, said securing means comprising a plurality of cores; and

(4) a plurality of wire strand means of controlled size adapted to be removably received in each of said plurality of cores so as to form a vertical plane with said base.

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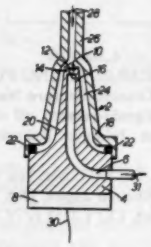
4,166,605

## DEVICE FOR METERING LIQUIDS

Samuel S. Hall, Hornchurch, and Francis J. Caves, Brentwood, both of England, assignors to Plessey Handel und Investments AG, Zug, Switzerland

Filed Jan. 19, 1977, Ser. No. 760,664
Claims priority, application United Kingdom, Jan. 20, 1976, 2203/76; Feb. 21, 1976, 6949/76
Int. Cl.[2] F16K 31/02
U.S. Cl. 251—129 7 Claims



1. A device for metering liquids, which device comprises a body, a liquid conduit in the body, electrically activated vibration means connected to said body for vibrating the body, a valve for opening the liquid conduit when the body is being vibrated and for closing the liquid conduit when the body is not being vibrated, and a conduit external of the body and arranged to conduct liquid towards or away from the liquid conduit in the body, a housing containing the conduit external of the body, the housing being joined to a portion of the body at a position which is spaced from a vibration node when the body is being vibrated by the vibration means, so that the housing is free to vibrate with the body when the body is being vibrated, the device being such that in operation liquid fed along one of the conduits is metered along the other conduit by activating the vibration means for a desired liquid metering time to cause the valve to open the liquid conduit in the body.

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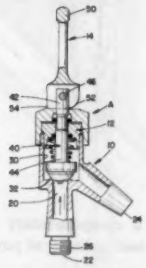
4,166,606

## FLOATING SEAL FOR FLUID CONTROL DEVICES

Raymond P. Kawolics, Solon; Donald R. Basel, Garfield Heights, and Frans L. Adeboi, Berea, all of Ohio, assignors to The Meyer Dairy Products Company, Cleveland, Ohio

Filed Nov. 10, 1976, Ser. No. 740,500
Int. Cl. F16k 31/60
U.S. Cl. 251—214 14 Claims



14. Secondary stem member seal means for a fluid control device of the type having a stem member which is selectively reciprocal by external means for controlling fluid flow through the device and having primary stem member seal means, said secondary stem seal means disposed outwardly of said stem member from said primary stem seal means, said secondary stem seal being movable between a normally non-sealing condition with said stem member and a sealing condition with said stem member only upon failure of said primary seal means and then being so movable into said sealing condition solely in response to the pressure of fluid by-passing said primary seal means.

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4,166,607

## BELLOWS SEAL VALVE

Maurice J. Webb, Mountain Lakes, N.J., assignor to Hoke, Inc., Cresskill, N.J.

Filed Oct. 14, 1976, Ser. No. 732,529
Int. Cl.[2] F16K 31/00
U.S. Cl. 251—335 B 1 Claim

1. In a bellows valve having:

a valve body with a fluid cavity including a control port coupling an inlet port to an outlet port;

a valve bonnet attached to said valve body at one end and having a control member mounting means at its opposite end;

a stem receiving aperture in said bonnet;

a valve stem mounted in said stem receiving aperture for axial movement towards and away from the control port;

a gland coupled to said bonnet having a non-round aperture thereby engaging a complimentary portion of said stem;

a port closing means positioned on one end of said stem and within said cavity;

a control member attached to the opposite end of said stem and threadably coupled to said mounting means;

the improvement comprising said stem receiving aperture having an enlarged portion at said one end of said bonnet forming a bellows receiving recess;

an elongated metallic bellows;

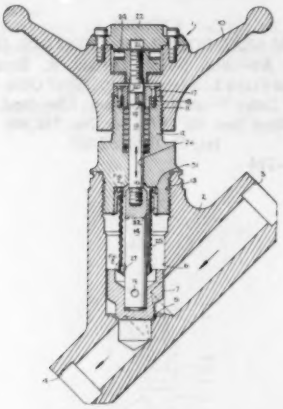
a ring attached at said one end of said stem;

one end of said bellows extending into said recess;

a hollow sleeve positioned within said recess and attached to the side walls of said recess;

a radially inward extending flange on said sleeve;

said one end of said bellows terminating in a generally circular cylindrical portion;



said flange having a complimentary circular cylindrical portion welded to said cylindrical portion of said bellows; and

the opposite end of said bellows welded to said ring.

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**4,166,608**

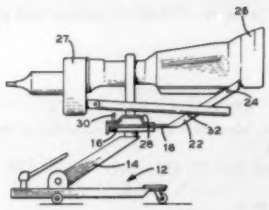
**JACK ATTACHMENT AND METHOD OF TRANSMISSION REMOVAL**

**Charles J. Scielle, 1817 Estella, Perry, Iowa 50220**

**Filed Apr. 4, 1978, Ser. No. 893,343**

**Int. Cl.[2] B66F *3/00***

**U.S. Cl. 254—133 R** **7 Claims**



1. An attachment for a motor vehicle transmission jack, said jack being of the type having a lift arm adapted to raise and lower motor vehicle transmission parts at its forward end, the attachment being adapted to support a fully assembled 4-wheel drive transmission unit, including the transfer case and the motor vehicle transmission support bracket, independently of a motor vehicle, the attachment comprising:

a base member, including means for supportably engaging and positioning the motor vehicle transmission support bracket substantially vertically of the forward portion of said lift arm;

means for rigidly connecting said base member to the forward portion of said lift arm; and

a forward support means for supportably engaging the forward portion of said motor vehicle transmission and, in conjunction with said base member, for supporting the motor vehicle transmission in a substantially horizontal position, said forward support means including a pair of spaced apart upwardly extending elongated members each rigidly secured to the base member at one end and at the other having means for supportably engaging the forward portion of the transmission.

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**4,166,609**

**DEVICE FOR DETECTING SURFACE LEVEL OF SCUM IN SCUM REMOVING APPARATUS**

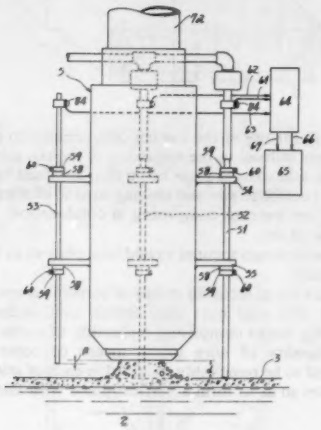
**Katsumi Nagasaki, Sakai; Koichi Tanimura, Suita; Yoshihiro Inoue; Hiroyuki Yamazaki, both of Amagasaki, and Tetsuo Momose, Hirakata, all of Japan, assignors to Kubota, Ltd., Osaka, Japan**

**Filed Aug. 18, 1977, Ser. No. 825,595**

**Claims priority, application Japan, Aug. 19, 1976, 51-99451; Aug. 19, 1976, 51-99452**

**Int. Cl.[2] C21C *7/04***

**U.S. Cl. 266—86** **6 Claims**



1. In a scum removing apparatus having a suction pipe, a device for detecting the surface level of the scum comprising:

a pair of electrode rods provided on the outer periphery of the front end of the suction pipe and projecting from the pipe end by a suitable length;

means for detecting variations in the electric resistance between the electrode rods; and

each of the electrode rods comprising a tube having accommodated therein a slider slidingly projectable from the front end of the tube and slidingly retractable into the tube.

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**4,166,610**

**VACUUM CARBURIZING FURNACE**

**Katsuhiro Yamazaki, Tanashi; Katsuro Nakamura, Tokyo, and Kiyotaka Miyake, Higashi-yamato, all of Japan, assignors to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Sep. 20, 1977, Ser. No. 834,978**

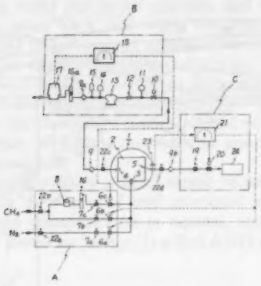
**Claims priority, application Japan, Oct. 28, 1976, 51-129622**

**Int. Cl.[2] C21D *1/74***

**U.S. Cl. 266—89** **4 Claims**

1. In a vacuum carburizing furnace wherein a gas feed system provided with a feed valve and an exhaust system provided with an exhaust valve are communicated with a vacuum vessel; pressure sensor means for sensing the furnace pressure and concentration sensor means for sensing the concentration of a carburizing gas in the furnace atmosphere; control means responsive to the output from said pressure sensor means for controlling said exhause valve of said exhaust system and responsive to the output from said concentration sensor for controlling said feed valve of said gas feed system, whereby the concentration of said carburizing gas in said furnace atmosphere as well as the furnace pressure may be optimumly

controlled, partition walls made of a material not subjected to the carburization disposed in a heating chamber of said vacuum carburizing furnace and spaced apart by a suitable distance from the respective opposing interior side walls of said heating chamber so as to define circulation passages between said partition walls and said interior side walls; and a fan having its parts made of a material not subjected to the carburization disposed above said circulation passages so that the furnace or carburizing atmospheric gases may be forced to circulate through said circulation passages and parts or articles to be carburized which are charged into said furnace and held in the space defined between said partition walls.



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**4,166,611**

**RAILWAY VEHICLE SPRING ASSEMBLY**

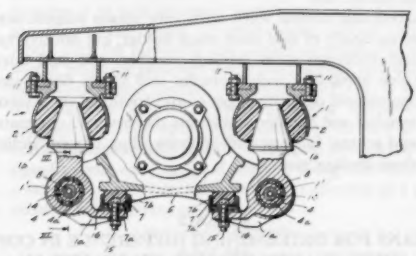
**Leo Geers, Holzbüttgen; Peter Müskens, Düsseldorf, and Dieter Schillings, Neuss, all of Fed. Rep. of Germany, assignors to Waggonfabrik Uerdingen A.G. Werk Dusseldorf, Düsseldorf, Fed. Rep. of Germany**

**Filed Aug. 18, 1977, Ser. No. 825,826**

**Claims priority, application Fed. Rep. of Germany, Sep. 16, 1976, 2641656**

**Int. Cl.[2] B61F** *5/30, 5/38, 5/52;* **F16F** *13/00*

**U.S. Cl. 267—3** **12 Claims**



1. A springing system for a rail vehicle having a longitudinal direction and two chassis elements which are movable relative to one another and include a frame and a wheel bearing extending transverse to the longitudinal direction of the vehicle, said springing system comprising two double-armed support elements each located at a different side of the wheel bearing, as considered in the longitudinal direction of the vehicle; two substantially vertical spring elements each interposed between a first one of said arms and one of said chassis elements; two bushings on the respective support elements intermediate the respective spring element and the other of said chassis elements and connected to said other chassis elements, said bushings being resiliently yieldable in vertical direction and in said longitudinal direction; and two resiliently yieldable intermediate elements each interposed between a second one of said arms and the other of said chassis elements, so that each of said bushings together with the respective intermediate element forms a stop for absorbing forces produced during acceleration and deceleration of the vehicle and acting in said longitudinal direction.

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**4,166,612**

**GAS SPRING WITH MEANS FOR IMPEDING PISTON MOVEMENT AWAY FROM ONE TERMINAL POSITION**

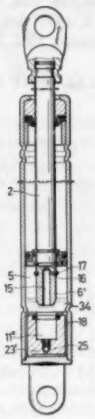
**Herbert Freitag, Koblenz-Metternich, and Klaus Schnitzius, Rheinbrohl, both of Fed. Rep. of Germany, assignors to Stabilus GmbH, Koblenz-Neuendorf, Fed. Rep. of Germany**

**Filed Apr. 26, 1977, Ser. No. 791,011**

**Claims priority, application Fed. Rep. of Germany, Apr. 30, 1976, 2619176**

**Int. Cl.[2] F16F** *9/48*

**U.S. Cl. 267—65 R** **7 Claims**



1. A gas spring comprising:

(a) a cylinder having an axis and defining a sealed cavity therein;

(b) a piston axially movable in said cavity between two axially terminal positions and axially dividing said cavity into two compartments,

(1) said compartments communicating through a passage at least in a position of said piston intermediate said terminal positions;

(c) fluid under superatmospheric pressure in said cavity;

(d) a piston rod fastened to said piston for joint axial movement therewith, said piston rod extending axially from said piston through one of said compartments and outward of said cavity; and

(e) brake means for controlling axial movement of said piston into and out of one of said terminal positions thereof, said brake means including,

(1) a plunger member fastened to said piston for joint movement therewith and axially projecting from the piston into the other compartment, said plunger member being formed with a bore therein,

(2) a brake member axially secured to said cylinder in said cavity, said brake member being formed with a recess axially open toward said other compartment and dimensioned for receiving a portion of said plunger member in said one terminal position of said piston,

(3) impeding means on said brake member impeding axial movement of said plunger member when received in said recess, said brake member and said cylinder bounding a throttling conduit therebetween permanently communicating with said other compartment,

(4) first one-way valve means on said plunger member permitting fluid flow from said recess through said bore into said other compartment while impeding fluid flow

from said other compartment into said bore in said one terminal position of said piston, and

(5) second one-way valve means operatively interposed between said recess and said throttling conduit for permitting fluid flow from said other compartment into said recess through said throttling conduit while impeding fluid flow from said recess into said other compartment in said one terminal position of said piston.

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**4,166,613**

## MECHANISM FOR CHIP-CUTTING AND CHIP-EJECTION IN THE PERFORATION OF SIGNATURES

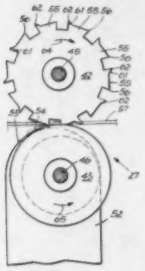
**Werner Kort, Nürtingen, and Ewald Gall, Hochdorf, both of Fed. Rep. of Germany, assignors to Maschinenbau Oppenweiler GmbH, Oppenweiler, Fed. Rep. of Germany**

**Filed Oct. 5, 1977, Ser. No. 839,586**

**Claims priority, application Fed. Rep. of Germany, Oct. 13, 1976, 2646159**

**Int. Cl.[2] B41F *13/56***

**U.S. Cl. 270—21** **3 Claims**



1. Chip-cutting and ejection mechanism for rectangular-slit perforation of a signature at a perforating location intermediate the respective spaced locations of penultimate and final folding operations of a machine for folding a signature from a single sheet wherein the penultimately folded sheet has in the machine a predetermined path of movement in the direction of its final fold axis and into position for the final-folding operation, said mechanism comprising a peripherally cogged first circular blade mounted on a first rotary axis offset on one side of said path and transverse to said path, second and third circular blades mounted on a second rotary axis parallel to said first axis and offset on the other side of said path, said second and third blades having spaced opposed parallel radial-plane surfaces, the cogs of said first blade meshing in the space between said second and third blades and said blades being adapted for driven rotation such that the speed of sheet movement is substantially matched at the blade-meshing location, the cogs while moving in meshed engagement with said second and third blades defining an arcuate blade meshing region, said radial-plane surfaces of said second and third blades being circumferentially continuous throughout at least the full radial extent of the blade-meshing region thereof, the meshing portion of each cog of said first blade being characterized by a first radially projecting transverse cutting edge at its rotationally leading end and by a second radially projecting transverse cutting edge at its rotationally trailing end, with a radially relieved longitudinal-edge cutting profile between said radially projecting ends, said projecting ends extending radially sufficient beyond said relieved cutting profile as to assure their cutting both longitudinal ends of each rectangular slit before punch-out of the longitudinal sides of the slit is completed, whereby punched-out chips are at least initially rotationally transported by and between said radial-plane surfaces, and ejector mechanism including an intercepting element extending between said radial-plane surfaces and in the rotary path of transported chips.

**4,166,614**

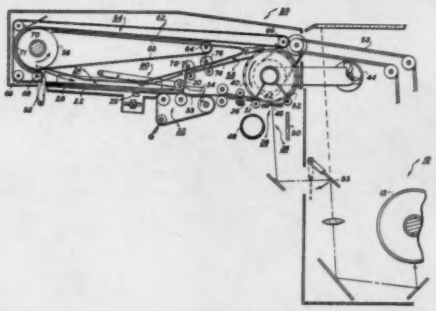
## JOGGING AND NORMAL FORCE FOR SHEET FEEDING

**Thomas J. Hamlin, and Clifford L. George, both of Macedon, N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Aug. 18, 1977, Ser. No. 825,751**

**Int. Cl.[2] B65H *1/06, 3/04, 31/34***

**U.S. Cl. 271—3.1** **10 Claims**



8. In a copier sheet feeder with a sheet stack holder adapted to retain a stack of sheets thereon, with front and rear ends, and with a sheet aligning front stack stop adjacent said front end, wherein intermittently operable bottom sheet feeding means are provided for feeding individual sheets from the bottom of a stack of sheets in said sheet stack holder in a sheet feeding direction past said front stack stop from said front end of said stack holder, and wherein sheet input means are provided to feed sheets into said sheet stack holder onto the top of a stack of sheets therein, and wherein normal force applicator means are provided to engage sheets in said stack holder adjacent said front stack stop to urge said sheets downwardly against said bottom sheet feeding means, the improvement wherein:

said bottom sheet feeding means includes a frictional sheet feeding belt member extending under said sheet stack and slightly above the plane of said sheet stack holder, with exposed opposite edges extending in said sheet feeding direction, and

wherein said normal force applicator means extends across transversely of said sheet stack holder, but not overlying said frictional sheet feeding member, and said normal force applicator means presses said sheets downwardly against said opposite edges of said frictional sheet feeding member and buckles said sheets thereover to concentrate said normal force at said opposite edges of said frictional sheet feeding member.

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**4,166,615**

## MEANS FOR DETERMINING DIFFERENCE IN COPY SHEET TRANSPORTATION STATES FOR AN ELECTROSTATIC REPRODUCTION MACHINE

**Hiroshi Noguchi, Toyonaka, and Yasuyoshi Kurokawa, Maebashi, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Continuation-in-part of Ser. No. 643,854, Dec. 23, 1975, abandoned. This application Aug. 5, 1977, Ser. No. 822,347**

**Claims priority, application Japan, Dec. 27, 1974, 49/2854**

**Int. Cl.[2] B65H *7/14, 7/04, 7/06***

**U.S. Cl. 271—259** **4 Claims**

1. A copy sheet transportation state detection arrangement for use in an electrostatic copying machine which comprises:

(a) entering and leaving copy sheet sensing switches each with electrical signal output capability provided for sensing the presence or absence of a copy sheet;

(b) a first copy sheet speed-sensing member with electrical signal output capability provided for monitoring the uniformity or nonuniformity in the speed of copy sheet trans-

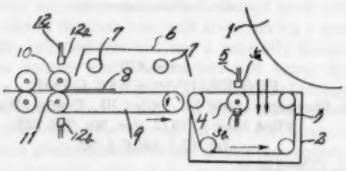
portation, said first speed-sensing member being juxtapositioned to said entering sheet-sensing switch;

(c) a second copy sheet speed-sensing member with electrical signal output capability provided for monitoring the uniformity or nonuniformity in the speed of copy sheet transportation, said second speed-sensing member being juxtapositioned to said leaving sheet-sensing switch;

(d) a driving roller positioned opposite said second speed-sensing member such that when the copy sheet is fed through said roller-member combination said copy sheet provides the friction between the driving roller and the second speed-sensing member so as to allow the speed-sensing member to rotate; and

(e) a counter for counting a predetermined number of clock pulses which, if reached, provides an abnormal state detection signal, and,

(f) means for providing a reset signal to said counter to prevent the provision of said abnormal state detection signal when transportation is normal, said reset signal providing means including (1) a first AND gate receiving



one actuating signal, via an inverter, from the entering switch denoting the presence of a sheet thereat and another actuating signal from the leaving switch indicating the absence of a sheet thereat, a second AND gate receiving one actuating signal from the first AND gate and another actuating signal from the first speed-sensing member via a first differentiation circuit, whereby, upon simultaneous occurence of all said actuating signals, said second AND gate provides a reset signal to said counter; (2) a third AND gate for receiving actuating signals from both the entering and leaving switches denoting the absence of sheets at both switches, whereby, upon simultaneous occurence of said actuating signals said third AND gate provides a reset signal to said counter; and (3) a fourth AND gate for receiving one actuating signal, via an inverter, from the leaving switch denoting the absence of a sheet thereat and another actuating signal, via a second differentiation circuit, from the second speed-sensing member, whereby upon simultaneous occurence of said actuating signals said fourth AND gate provides a reset signal to said counter, paid counter being activated and reset signal cleared away upon the introduction of a copy sheet at said entering sensing switch.

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**4,166,616**

## TENNIS RACKET

**Minoru Kohzu, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Japan**

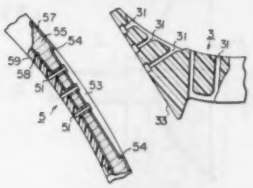
**Filed May 20, 1977, Ser. No. 798,842**
**Claims priority, application Japan, May 25, 1976, 51-60475**
**Int. Cl.[2] A63B *49/02***
**U.S. Cl. 273—73 G** **7 Claims**

1. An improved tennis racket, comprising:

a frame shaped to have an inner side and having two coupling areas on said inner side, with said coupling areas generally facing toward each other and being located substantially symmetrically about the axial line of said racket;

each said coupling area on said inner side comprising the surface of said frame on said inner side having a recess defined therein, and each said recess extending longitudinally along said frame inner side; spaced apart shoulders on said frame inner side defining the longitudinal ends each of said recess along said frame; said frame inner side having upstanding opposed side walls along the lateral sides of each said recess and said side walls defining each said recess between them, whereby each said recess is defined and its length and width dimensions are determined by said shoulders and said side walls;

a yoke having outer fringes defined along generally opposite sides thereof; each said fringe being received in a respective recess; each said fringe being shaped and dimensioned



such that said fringe contacts both said shoulders and both said side walls of said recess, whereby each said fringe is snugly received in the respective said recess;

means for fastening said yoke to said frame;

each of said mating recesses being provided with a flat, uncurved bottom surface and each of said fringes of said yoke is provided with a flat uncurved surface which contacts the respective said recess bottom surface.

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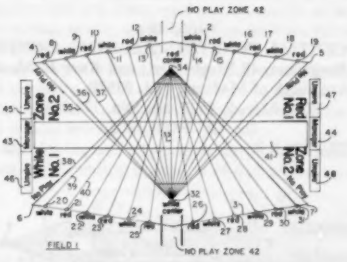
**4,166,617**

## FIELD GAME

**Angel de Jesus, 559 W. 172nd St., #1A, New York, N.Y. 10032**

**Filed Jun. 30, 1978, Ser. No. 920,737**
**Int. Cl.[2] G09B *67/00, 43/02***
**U.S. Cl. 273—95 H** **4 Claims**




1. A field game played by two teams each consisting of a leader and twelve players, said field game comprising

a field marked with first and second spaced generally parallel lines of equal length each having spaced opposite first and second ends and twelve player positions marked thereon, first and second leader positions marked on a center line equidistant from the ends of the lines and extending substantially perpendicular thereto, the first leader position being considerably closer to the second line than to the first line and the second leader position being considerably closer to the first line than to the second line, a plurality of lines extending from the first leader position to each player position on the first line and a plurality of lines extending from the second leader position to each player position on the second line; and

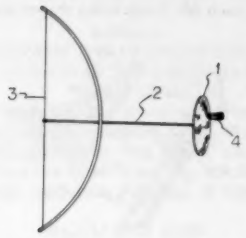
a pair of identical oval balls each being of a color different from the other and each having an axial length with a pair of spaced opposite ends, each of the balls having a handle member extending coaxially therefrom at one axial end thereof.

**4,166,618**

## MISSILE LAUNCHING DEVICE COMBINED WITH TARGET

**Sang K. Sheem, 7917 Spotswood Dr., Alexandria, Va. 22308**

**Filed Aug. 10, 1977, Ser. No. 823,412**
**Int. Cl.[2] A63B *67/18*; F41J *3/00*; A63B *65/00***
**U.S. Cl. 273—96 R** **1 Claim**




1. A game toy for projectile launching and catching comprising a target having a substantially planar projectile landing and launching forward surface, an arrow secured to the center of the rear of the target for movement of the arrow and the entire target together as a unit, said surface being perpendicular to the arrow and extending a substantial distance in all directions perpendicular to the length of the arrow, a bow carrying a bow string, the end of the arrow opposite the target being connected to the bow string, one part of a two-part self-fastening textile material covering the whole of said forward surface of the target, and a projectile that carries the other part of said two-part self-fastening textile material, whereby the projectile can be caught and retained at any point on said surface of the target and, upon subsequently drawing and releasing the arrow, can be launched from that same point on the target at the end of the path of forward movement of the arrow and target relative to the bow.

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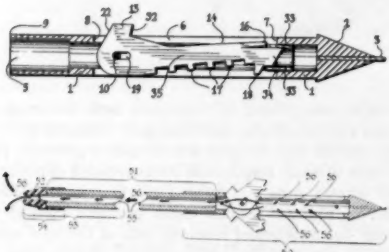
**4,166,619**

## SEQUENTIAL FUNCTION HUNTING ARROWS

**Bruce A. Bergmann, 45 Maple Ave., and Kurt A. Mueller, 18 Maple Ave., both of Madison, N.J. 07940**

**Filed Mar. 3, 1977, Ser. No. 773,917**
**Int. Cl.[2] F41B *5/02***
**U.S. Cl. 273—106.5 B** **25 Claims**



13. A sequential function projectile head comprising, in combination, a generally elongate body member having a forward end and a rearward end and being generally pointed at the forward end portion thereof for purposes of penetration of a target object, a generally elongate slot formed in said body member to extend generally longitudinally thereof, a generally elongate cutting blade having a cutting part which is sized relative to said slot so as to be disposable substantially within said slot, said cutting blade having a forward portion and a rearward portion, mounting means operatively associated with said body member and the rearward portion of said cutting blade for pivotally mounting said cutting blade within said slot, said cutting blade being pivotal on said mounting means between a closed position thereof wherein said cutting blade part is disposed substantially within said slot to an open position thereof wherein said cutting blade part has been pivotally moved out of said slot away from said forward end of said body member and toward said rearward end of said body member to expose said cutting blade part, retaining means operatively associated with said cutting blade and said body member and operable to prevent the pivotal movement of said cutting blade into said open position thereof, said retaining means and said blade being mounted for relative longitudinal movement with respect to the longitudinal axis of said body member, and triggering means operatively associated with said cutting blade and operable upon penetration of said target object by said body member to cause said relative longitudinal movement to release said retaining means, and to initiate the pivotal movement of said cutting blade to said open position thereof to expose said cutting blade part.

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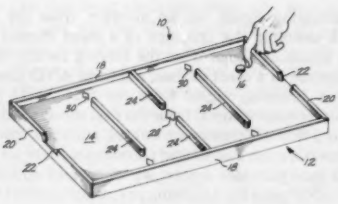
**4,166,620**

## FINGERTIP HOCKEY GAME

**John J. Sheppard, 15446 SE. 142nd Pl., Renton, Wash. 98055**

**Filed May 5, 1977, Ser. No. 794,148**
**Int. Cl.[2] A63F *3/00***
**U.S. Cl. 273—126 R** **8 Claims**



1. A hockey type board game comprising:

(a) a playing board having a top, playing surface which is smooth and flat, over which a puck is propelled;

(b) a raised outer wall defined by a pair of parallel, spaced apart, opposed end walls and a pair of parallel, spaced apart, opposed side walls secured to and bordering at least a portion of said playing board to both retain said puck on said playing surface and to provide a rebound surface off which said puck may be accurately caromed during play;

(c) a goal located at each of two opposing ends of said playing board and comprising an aperture defined by said end walls and,

(d) a plurality of inner wall means disposed on said playing surface and extending substantially parallel to said end walls, with at least one of a pair of said inner wall means being disposed opposite each of said goals such that an open playing surface exists therebetween, and with each one of a pair of said inner wall means having a path disposed around the ends thereof, and another pair of said plurality of inner wall means being disposed on said playing surface between said pair of inner wall means disposed adjacent each of said goals, with said inner wall means intersecting said outer wall at one end thereof and adapted to leave a central area of said playing surface of said game board open whereby a playing piece may traverse said playing surface between said inner end walls without obstruction and,

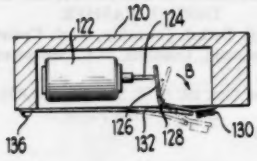
(e) wherein a face-off mark is located on the playing surface at said central area of a board to define a starting position of the puck.

4,166,621

## PROGRAMMABLE RECORD CHANGER

Anson Isaacson, Chicago; Howard J. Morrison, Deerfield, both of Ill.; Ralph H. Baer, Manchester, N.H.; Donald K. Fletchic, Arlington Heights, and Albert G. Keller, Chicago, both of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Division of Ser. No. 682,079, Apr. 30, 1976, Pat. No. 4,093,832.
This application Nov. 18, 1977, Ser. No. 852,672
Int. Cl.[2] G11B *3/00*
U.S. Cl. 274—1 R 9 Claims




1. A phonograph tone arm lift mechanism, comprising:

a selectively actuatable generally L-shaped lever mounted on the end of the tone arm, said lever having a generally vertically oriented free end and a generally horizontally directed contact end, the contact end being movable between a horizontal retracted position out of engagement with the record surface and a canted actuated position in engagement with the record surface for elevating the stylus to a predetermined height above the record; and

means for actuating said lever including a horizontally mounted solenoid on the end of the tone arm, said solenoid having an armature movable in a plane parallel to the record surface into engagement with the free end of said lever to lift the tone arm in response to actuation of said solenoid.

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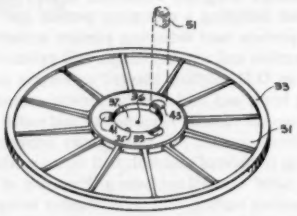
4,166,622

## CENTERING COLLAR FOR A DISK HUB

Edgar A. Rager, 601 Almarida, Apt. T6, Campbell, Calif. 95008

Filed Feb. 13, 1978, Ser. No. 877,183
Int. Cl.[2] G11B *3/70, 5/82;* B25G *3/10*
U.S. Cl. 274—1 R 7 Claims




1. Apparatus for centering a member on a rotating spindle comprising,

an annular member defining a central hole with dimensions greater than corresponding outside dimensions of the rotating spindle on which said annular member is intended to fit, said annular member having a geometric center corresponding to the axis of rotation of the spindle, said annular member having a plurality of indentations spaced at intervals facing said central hole, and

a plurality of compression members, each shaped to fit in an interlocking relationship with an indentation of said annular member and partially projecting into said hole, said compression members having a finger portion compressibly connected to the remainder of said compression member, said finger shaped to snugly contact corresponding portions of a spindle so that said annular member is centered on said spindle.

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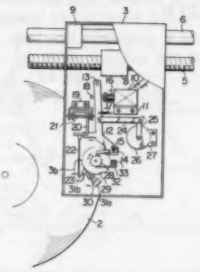
4,166,623

## PICKUP NEEDLE CLEANING DEVICE FOR RECORD DISC PLAYBACK APPARATUS

Kenji Nanbu, Moriguchi, and Akio Kuki, Katano, both of Japan, assignors to Matsushita Electric Industries Co., Ltd., Osaka, Japan

Filed Jan. 17, 1978, Ser. No. 870,209
Int. Cl.[2] G11B *3/58*
U.S. Cl. 274—1 R 8 Claims



1. A pickup needle cleaning device for a recording disk playback apparatus comprising:

a pickup needle adapted to detect recorded signals from a recording disc,

means for holding said pickup needle,

a carrige supporting said holding means and adapted to move above and along the recording disk,

means for driving said carriage above and along said recording disk,

means, mounted on said carriage, for moving said holding means to lift and lower said pickup needle so as to move said pickup needle towards and away from the recording surface of said recording disk,

means, mounted on said carriage, for actuating said lifting and lowering means,

means, mounted on said carriage, when driven, for cleaning said pickup needle, and

means for driving said cleaning means in association with the lifting and lowering operation of said pickup needle.

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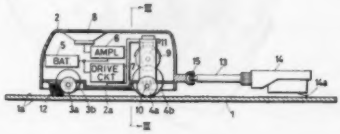
4,166,624

## RECORD PLAYER

Yoshihisa Mori; Shingo Tamura, both of Tokyo; Susumu Hoshimi, and Shiro Yasuda, both of Yokohama, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed May 23, 1978, Ser. No. 908,740
Int. Cl.[2] G11B *3/02, 25/04*
U.S. Cl. 274—9 C 8 Claims




1. A phonograph record player suitable for use with a stationary disc phonograph record having a spiral sound groove, said record player comprising a movable body to be placed on said record, drive means for driving said movable body to move in a generally circular path on said record, sound reproducing means associated with said movable body for engaging

said sound groove and reproducing a sound signal recorded therein, and a sound groove guidance member connected to said movable body and arranged to engage said sound groove for guiding said movable body in the direction of said sound groove.

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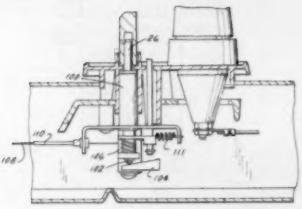
**4,166,625**

## AUTOMATIC STOP FOR TURNTABLE TONE ARM

**Frank J. Frielingsdorf, Port Jefferson, N.Y., assignor to Pickering & Company, New York, N.Y.**

**Filed Jun. 21, 1978, Ser. No. 917,531**
**Int. Cl.[2] G11B *3/10***
**U.S. Cl. 274—23 R** **6 Claims**



1. A phonograph turntable comprising: a base; a record support platter mounted for rotation on said base; drive means for said platter; a tone arm support extending upwardly from said base; a tone arm having a first end pivotally mounted to said support and a second end; a cueing post mounted for vertical movement beneath said tone arm, a horizontal cradle affixed to the top end of said post; means for shifting said cueing post vertically; and, switch means for actuating said last mentioned means including a reed switch mounted to one of said tone arm support and tone arm and a magnet mounted to the other of said tone arm support and tone arm whereby said switch means are actuated when said reed switch and magnet are aligned.

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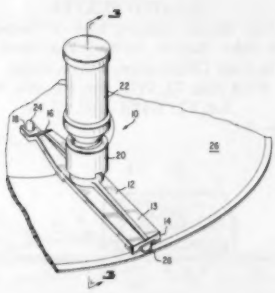
**4,166,626**

## RECORD CLEANER

**Joseph Sandor, Reseda, and Claude P. Davis, Woodland Hills, both of Calif., assignors to California Sounds, Ltd., Tarzana, Calif.**

**Filed Dec. 23, 1977, Ser. No. 863,897**
**Int. Cl.[2] G11B *3/58***
**U.S. Cl. 274—47** **9 Claims**



1. A record cleaning device comprising:
an elongated arm member having cleaning means disposed on one side thereof, said cleaning means for engaging and cleaning the surface of a record so as to remove dirt and other undesirable material therefrom;
a rotatable member coupled to said arm member such that said device can be selectively rotated about a record to be cleaned;
a cleaning fluid reservoir coupled to said rotatable member for supplying said cleaning means with a cleaning fluid; and
valve means disposed in said rotatable member for regulating the flow of said cleaning fluid to said cleaning means.

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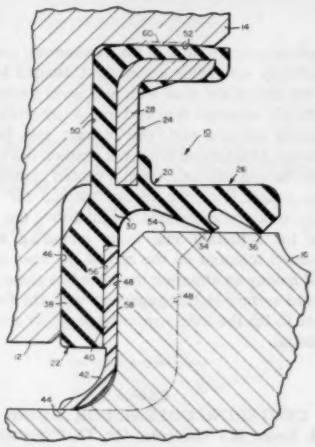
**4,166,627**

## THRUST WASHER AND COMBINATION SEAL AND THRUST WASHER

**Dean R. Bainard, Bethel Township, York County, S.C., and Martin E. Benjamin, Gastonia, N.C., assignors to Garlock Inc., Palmyra, N.Y.**

**Filed Oct. 19, 1976, Ser. No. 733,890**
**Int. Cl.[2] F16J *15/34***
**U.S. Cl. 277—95** **29 Claims**



1. An article comprising:
(a) a unitary seal and thrust washer comprising a seal and a thrust washer integrally connected to said seal;
(b) said seal including a mounting portion and an integral sealing portion, said mounting portion including a cylindrical portion and a radial flange, said cylindrical portion having an O.D. surface adapted to form a press-fit in a housing bore, and said sealing portion extending axially away from the radially inner end of said radial flange, and
(c) said thrust washer being integrally connected to said mounting portion of said seal, said thrust washer having a pair of radial contact surfaces at least one of which is a radial bearing surface, said thrust washer being adapted to be positioned between and in contact with a pair of opposed radial faces of a pair of relatively axially and rotatably movable members for carrying an axial load while accommodating rotary motion therebetween, and said thrust washer extending radially inwardly from said radial flange of said seal.

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**4,166,628**

## GREASE PURGEABLE BUSHING SEAL

**Thomas J. Blaydon, Lincolnton, N.C., assignor to Garlock Inc., Palmyra, N.Y.**

**Filed May 30, 1974, Ser. No. 474,385**
**Int. Cl.[2] F16J *15/32***
**U.S. Cl. 277—152** **7 Claims**

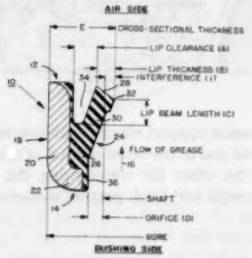
1. A narrow cross-section grease purgeable bushing seal for installation in a bore of a housing having a narrow cross-section bushing installed therein, said seal as installed having the

same shaft and bore dimensions as does the bushing and comprising:

(a) a metal shell having a cylindrical portion and a radially inwardly extending portion at the bushing side of the cylindrical portion; and

(b) an elastomeric sealing element bonded onto the inner surface of said shell and having a main body portion at the bushing side of said shell,

a flex portion that tapers radially inwardly and axially outwardly from the main body portion and terminating at a sealing lip portion having a sealing lip, said seal having an




annular channel between said sealing lip portion and said shell, said seal having a cross-sectional thickness E, a lip clearance A, a lip thickness B, a lip beam length C, an interference i, an orifice D, and wherein the above-mentioned parameters of said seal have the following ranges:

$E \leqq 0.100$ inch $+ i$

$i = 0.000$ to 0.015 inch

$A \geqq B$

$B \geqq 23\% (E - i)$

$C \geqq 45\% (E - i)$

$D \geqq 31\% (E +)$.

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**4,166,629**

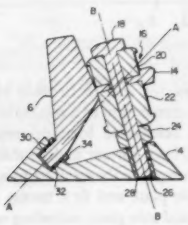
## SKATEBOARD TRUCK

**Richard A. List, 177-F Riverside Ave., Newport Beach, Calif. 92663**

**Filed Nov. 21, 1977, Ser. No. 853,572**

**Int. Cl.[2] A63C *17/02***

**U.S. Cl. 280—11.28** **5 Claims**




1. A skateboard truck comprising:

(a) a base, said base having a first portion with a first hole therein and a second portion with a second hole therethrough said first hole having an axis passing longitudinally through the center thereof;

(b) a hanger, said hanger having an axle for mounting wheels thereon, a ring means having a third hole therethrough; said third hole having a center positioned midway between the sides of the ring at the edges of said hole on a second longitudinal axis through said third hole and said second hole, and a pin means having an axis passing longitudinally through the center thereof, said pin means being received in said first hole wherein the axis of said pin means coincides with the axis of said first hole and wherein the axis of said pin means and said first hole pass through the center of the third hole of said ring means at an angle with respect to the plane of the third hole of said ring means; and

(c) coupling means for coupling said hanger to said base, said coupling means passing on said second longitudinal axis through the third hole of said ring means and being received in said second hole of said base.

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**4,166,630**

## CHILD PROPELLED RIDING TOY

**Paul J. Sullivan, 300 Metacom Ave., Bristol, R.I. 02809; Fredric C. Behling, 657 Exmmor Ct., Crystal Lake, Ill. 60014, and George W. Ptaszek, East Ave., Pascoag, R.I. 02859**

**Filed Apr. 25, 1978, Ser. No. 899,809**

**Int. Cl.[2] B62M *1/00***

**U.S. Cl. 280—87.02 R** **9 Claims**

1. A wheeled vehicled comprising a generally longitudinally orientated body member supported for rolling movement by a pair of wheels connected thereto and in generally longitudinal alignment with each other at forward and rear portions respectively of said body, said body further including a generally centrally disposed support area for one knee of an operator of said vehicle, steering means for simultaneously supporting the operator's hand opposite said one knee and for permitting turning of said front wheel, and an outrigger support for the other hand of the operator, said outrigger support laterally extending from one side of said body at a generally forward position thereof and provided with an additional vehicle supporting wheel at an outer portion thereof.

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**4,166,631**

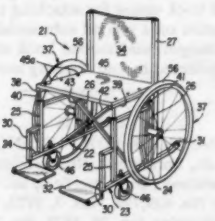
## SPORTS WHEELCHAIR

**David E. Sanaski, 1726 S. 176th Ave., Buckeye, Ariz. 85326**

**Filed Oct. 19, 1977, Ser. No. 843,541**

**Int. Cl.[2] B62M *1/14***

**U.S. Cl. 280—242 WC** **13 Claims**




10. A sports wheelchair comprising:

(a) a first generally upright frame member;

(b) a first wheel rotatably mounted on said first frame member;

(c) a second generally upright frame member spaced from said first frame member;

(d) a second wheel rotatably mounted on said second frame

member, said first and second wheels having tops and bottoms;

(e) a wheelchair seat supported by said first and second frame members and extending therebetween; and

(f) means extending between said first and second frame members for coupling said frame members together in selectively variable dispositions with respect to each other to provide a distance between the tops of said wheels which is different than the distance between the bottoms of said wheels to render the camber of said wheels selectively adjustable.

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**4,166,632**

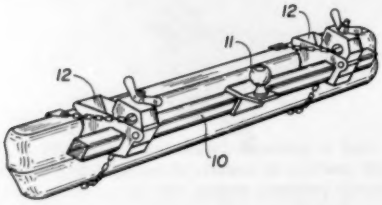
**BUMPER HITCH ASSEMBLY**

**Rex E. Myerscough, 2806 Edenwood, Clearwater, Fla. 33519**

**Filed Feb. 8, 1978, Ser. No. 876,025**

**Int. Cl.[2] B60D** *1/00, 1/04, 1/06*

**U.S. Cl. 280—502** **11 Claims**




1. A hitch adapted to be attachable to a bumper of a vehicle for towing another vehicle comprising:

(a) a drawbar comprising an elongated bar;

(b) hitch means attached to said drawbar adapted for connecting a vehicle to be towed to a towing vehicle;

(c) clamping means attached to said drawbar and adapted to connect said drawbar to a bumper of a towing vehicle comprising:

(i) a bumper abutting member having a first opening therethrough for receiving said drawbar, an edge adapted to abut said bumper, said bumper abutting member extending from said drawbar to said abutting edge, a second opening therethrough comprising a curved annular passageway, said curved passageway having openings directed toward said abutting edge;

(ii) locking means for locking said hitch to said drawbar, said locking means being in pivoting contact with said abutting member;

(iii) first hook means for attaching said hitch to at least two laterally spaced locations to one substantially horizontal edge of said bumper, said first hook means being received within said curved passageway;

(iv) second hook means for attaching said hitch to at least one location on a second substantially horizontal edge of said bumper, said second hook means being threadingly connected to said abutting member.

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**4,166,633**

**COUPLING HOOK FOR PULLING VEHICLES**

**Hardin Joyce, Jr., Springfield, Ill., assignor to Fiat-Allis Construction Machinery, Inc., Deerfield, Ill.**

**Division of Ser. No. 629,795, Nov. 7, 1975, Pat. No. 4,088,340. This application Jan. 30, 1978, Ser. No. 873,518**

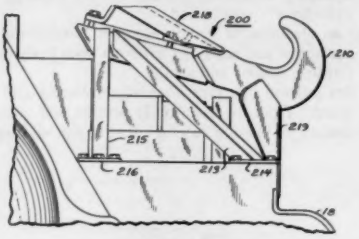
**Int. Cl.[2] B60D** *1/04*

**U.S. Cl. 280—504** **6 Claims**

1. A coupling carried by a vehicle in a position for use in tandem pulling of vehicles comprising

hook means carried by a vehicle in a position for engaging a tow bar of another vehicle to transmit a pulling force for effecting tandem pulling of the vehicles,

said hook means having a hook portion for coupling the pulling force and a single shank portion extending therefrom forming a beam portion for facilitating engagement of the tow bar of the other vehicle with said hook portion, said single shank portion connected to tensile support means




and compression support means, each secured to the vehicle at one end and to the beam portion of said single shank portion at the other for transmitting the pulling force coupled through said hook portion to the vehicle.

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**4,166,634**

**ATTACHMENT FOR RELEASE SKI BINDINGS**

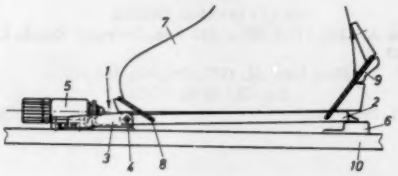
**Gustav Kirchmeyr, Innsbruck; Erwin Weigl, Brunn am Geb; Jaroslav Knotek, and Tibor Szasz, both of Vienna, all of Austria, assignors to TMC Corporation, Baar, Switzerland**

**Filed Apr. 4, 1977, Ser. No. 784,440**

**Claims priority, application Austria, Apr. 7, 1976, 2481/76**

**Int. Cl.[2] A63C** *9/00*

**U.S. Cl. 280—614** **8 Claims**



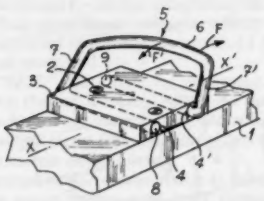

1. In an attachment for use in cross-country skiing and adapted for operative connection to a releasable toe ski binding member having first releasable locking means thereon for normally holding a ski boot for use in downhill skiing, said toe ski binding member being fixedly secured to a ski, said attachment comprising a sole plate and first means for holding said sole plate on said ski, said sole plate including second means for securing said ski boot thereto, the improvement comprising wherein said first means includes a connecting piece permanently and pivotally connected through an axle to said sole plate, said axle being located substantially directly below the toe of said ski boot and extending transversely with respect to the longitudinal axis of said ski, a spring, said spring being adapted to yield to movement of said sole plate upwardly with respect to said connecting piece and about said axle and second releasable locking means on said connecting piece and on said toe ski binding member separate from said first releasable locking means for permitting said sole plate and the connected connecting piece to be selectively connected to said toe ski binding member without necessitating a movement of said toe ski binding member and to be replaced with a sole plate adapted for use in downhill skiing.

4,166,635

## DEVICE FOR HOLDING A BOOT TO A SPORTS ARTICLE

Georges P. J. Salomon, Annecy, France, assignor to Etablissements Francois Salomon et Fils, Annecy, France

Filed May 4, 1977, Ser. No. 793,617
Int. Cl.[2] A63C 9/10, 9/085
U.S. Cl. 280—625 19 Claims



1. A device for retaining an object between two elements at least one of which is movable relative to the other, one of said elements being a support means for said object, the other of said elements being a pressure part pivoted in relation to said support means in and out of object retaining position, said device comprising

(a) a resilient means having at least one resiliently deformable portion, said resilient means acting between said two elements and applying to said object a resilient force maintaining said object on said support means upon deformation of said at least one resiliently deformable portion, said resilient means comprising

(i) two pivoting parts rotatably received in one of said two elements along spaced, substantially parallel axes; and

(ii) a connecting part uniting said pivoting parts and connecting said pivoting parts to the other of said elements.

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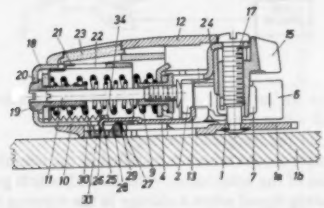
4,166,636

## SKI BINDING PART

Josef Svoboda, Schwechat, and Karl Stritzl, Vienna, both of Austria, assignors to TMC Corporation, Baar, Switzerland

Filed Apr. 11, 1977, Ser. No. 786,390
Claims priority, application Austria, Apr. 14, 1976, 2721/76
Int. Cl.[2] A63C 9/08
U.S. Cl. 280—625 12 Claims



1. In a ski binding having a binding housing mounted on the upper surface of a ski comprising symmetrically arranged, two-arm sole holders pivotal between a sole holding position and a sole releasing position about ski-fixed axes which are arranged perpendicularly with respect to said upper surface and which each rest with one arm thereof on the sole of a ski boot and a second arm thereof rests on one end of a slide member movably supported in said binding housing, the other end of said slide member being operatively engaged with a spring adjustably supported in said binding housing, wherein the improvement comprises control means operatively connected to one of said slide member and said sole holders and defining a tripping point which becomes effective in response to a predetermined amount of movement of said sole holders toward said releasing position thereof to effect a decrease in the force which is produced by said spring and permit a resistance free movement of both of said sole holders to said released position thereof.

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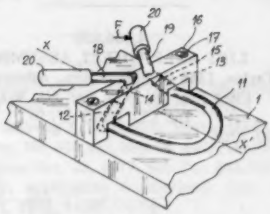
4,166,637

## DEVICE FOR HOLDING A BOOT TO A SPORTS ARTICLE

Georges P. J. Salomon, Annecy, France, assignor to Etablissements Francois Salomon et Fils, Annecy, France

Filed May 4, 1977, Ser. No. 793,618
Int. Cl.[2] A63C 9/10, 9/085
U.S. Cl. 280—625 19 Claims



1. A device for holding an object between two elements at least one of which is movable in relation to the other, one of said elements being a means of support for the object while the other is a pressure member pivotable about at least one axis in relation to said means of support, comprising

(a) a resilient means having at least one resiliently deformable portion and acting between said two elements and causing said pressure member to be applied to said object, said resilient applying to said object, through said pressure member, a resilient holding force upon deformation of said at least one deformable portion, said portion comprising

(i) two pivoting parts connected to said pressure member, each said part being pivotable about an axis relative to said means of support; and

(ii) two journalling parts each connected to one of said two elements along axes forming with the pivoting planes of the corresponding pivoting part an angle other than 90°, said journalling parts being so disposed that planes perpendicular to the axes of the parts converge and intersect in a line.

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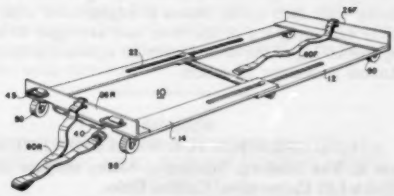
4,166,638

## ADJUSTABLE DOLLY

Alfred De Prado, 2068 - 80th St., Brooklyn, N.Y. 11214

Filed Apr. 25, 1978, Ser. No. 899,982
Int. Cl.[2] B62D 21/14
U.S. Cl. 280—638 2 Claims



1. A platform base fitted with caster wheels with means to adjust the length of the base, comprising

two U-shaped elements, each formed with a pair of spaced leg portions joined to a bight portion, with caster wheels mounted under each U-shaped element, in which

each leg portion is formed with a longitudinal slot, together with

a pair of bolts, with

each leg portion of each U-shaped element slidably joined to a corresponding leg portion of the other U-shaped element by a said bolt, with

a cushion mounted under the bight portion of one U-shaped element adaptable for resting against the shoulder of a user, and with a pair of hand grips extending externally from the bight section of the other U-shaped element for use in lifting that end of the base, together with

a cross-bar fastened at each opposed end to one of said bolts that join the leg portions of the U-shaped element, and with means to fasten a strap to each U-shaped element for use in fastening a load on the platform base.

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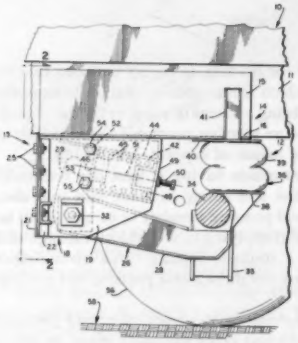
**4,166,639**

## LIFT AXLE WHEEL ASSEMBLY

**Glenn E. Taylor, 1345 Bankhead Ave., Atlanta, Ga. 30318**

**Filed Feb. 28, 1978, Ser. No. 882,234**
**Int. Cl.[2] B60G *11/56***
**U.S. Cl. 280—704** **8 Claims**



1. A lift-axle wheel assembly for a wheeled vehicle comprising: an axle for placement transversely beneath the vehicle, a housing for mounting to the frame of the vehicle at each end of said axle, an approximately L-shaped lever in each housing pivotally mounted at the intersection of its legs in each housing about an approximately horizontal axis and pivotable in an approximately vertical plane with one leg of said lever extending in an upward direction and the other leg of said lever extending longitudinally with respect to the vehicle, said axle being mounted at its ends on a longitudinally extending leg of each lever, an inflatable pneumatic chamber mounted at each end of said axle for bearing between the frame of the vehicle and said axle and, upon inflation, urging said axle downwardly with respect to the vehicle, and coil compression spring means mounted in each of said housings over and approximately parallel to the longitudinally extending leg of the lever in the housing with each spring means in engagement with the upwardly extending leg of the lever and arranged to urge the longitudinal leg of the lever upwardly against the force of the inflatable pneumatic chambers.

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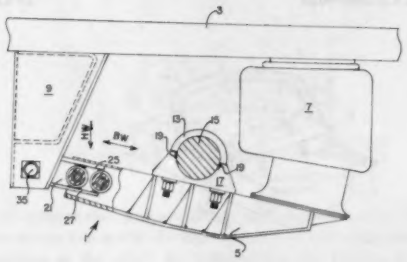
**4,166,640**

## AXLE SUSPENSION FOR WHEELED VEHICLES

**Ervin K. Van Denberg, Muskegon, Mich., assignor to Turner Quick-Lift Corporation, Canton, Ohio**

**Filed Apr. 14, 1978, Ser. No. 896,129**
**Int. Cl.[2] B60G *13/02***
**U.S. Cl. 280—711** **24 Claims**

1. In an axle suspension system comprising an elongated, substantially rigid beam, a pneumatic bellows located at one end of the beam, a hanger bracket located at the other end of the beam, means for pivotally connecting the hanger bracket to the beam and means for connecting an axle to the beam located intermediate the ends of the beam, the improvement comprising, means for rigidly connecting said axle connecting means to said beam, said axle connecting means being capable of being rigidly connected to the axle thereby forming a rigid axle to beam connection, and an elastic means having a different degree of deflection beamwise than hangerwise, said elastic means being located at a spaced distance from said axle con-



necting means in the path of articulation forces between the beam and hanger bracket and being sufficiently resilient to allow operative deflections in response to said articulation forces and at the same time restrain longitudinal movement sufficiently to maintain substantially constant the distance between the hanger bracket and the axle connecting means.

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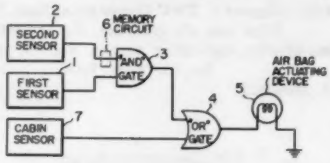
**4,166,641**

## INFLATOR FOR SAFETY AIR BAG IN AN AUTOMOTIVE VEHICLE

**Motohiro Okada, Asaka, and Taiji Ohmori, Kawagoe, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Aug. 19, 1977, Ser. No. 826,045**
**Claims priority, application Japan, Aug. 24, 1976, 51-100781**
**Int. Cl.[2] B60R *21/08***
**U.S. Cl. 280—735** **1 Claim**




1. A device for inflating a safety air bag in an automotive vehicle which comprises in combination:

(a) means for inflating said air bag;

(b) first sensor means which is installed in the neighborhood of a cabin of the automotive vehicle, and which generates an actuating signal when a change in the running speed of the vehicle within a sampling time exceeds a predetermined value, said sampling time being the maximum delay in detection time permitted to said sensor means to impart the actuating signal to said air bag inflating means after vehicle collision takes place so that the safety air bag may exhibit satisfactory performance to protect the vehicle riders from unexpected danger of accident, said first sensor being composed of:

1. an accelerated speed detector;
2. a signal conditioner connected in series with said detector and for amplifying an output signal from said detector to a certain definite level;
3. a plurality of integration circuits to receive the amplifier signals from said signal conditioner, each said integration circuit being composed of an amplifier, a capacitor, and a resistor;

4. a plurality of differentiation circuits, each being composed of a capacitor, a resistor, and a diode;
5. a multi-vibrator for generating reset pulses, outputs therefrom in rectangular waveforms being applied to each of said integration circuits through each of said differentiation circuits with a predetermined lag in phase between them;
6. a plurality of comparators for generating output signals when an integration voltage to be imparted to the input terminals (−)of said integration circuits becomes higher than established voltages which have already been imparted to the input terminals (+) of each of the comparators; and
7. "NOR" gate circuit for generating, at the output terminal thereof, a control signal of a predetermined level to actuate the safety air bag actuating means, when such output signal from any one of said comparators assumes a certain definite level;

(c) second sensor means which is installed in front of said first sensor means, and which detects the change in the vehicle speed at the intial stage of collision;

(d) third sensor means which is installed in said vehicle cabin, said sensor having no sampling time relative to a predetermined speed reduction value in the vehicle; and

(e) memory means to store therein an output from said second sensor means, said air bag inflating means being actuated, upon collision, in response to either the presence of both said control signal generated from said "NOR" gate circuit in said first sensor means and the stored output from said second sensor, or only said third sensor.

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**4,166,642**

## INSTALLATION ACCOMMODATED IN A HOLLOW VEHICLE BEARER FOR THE HEIGHT ADJUSTMENT OF AN UPPER DEFLECTION FITTING FOR THE SHOULDER BELT OF A BELT SYSTEM

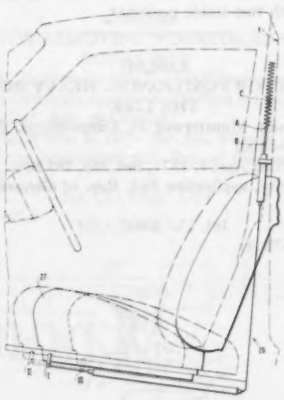
**Walter Jahn, Sindelfingen, and Jürgen Gimbel, Gechingen, both of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Nov. 1, 1977, Ser. No. 847,496**

**Claims priority, application Fed. Rep. of Germany, Nov. 9, 1976, 2651037**

**Int. Cl.² A62B *35/00***

**U.S. Cl. 280—806** **21 Claims**



1. A mechanism, accommodated in a hollow vehicle bearer, for adjusting the height of an upper deflection fitting for a shoulder belt of a belt system, comprising:

guide means for infinitely variably displaceably adjusting the position of said mechanism within said hollow bearer;

engagement means provided in a wall of said hollow bearer;

detent means operatively connected with the deflecting fitting and being provided with complementary engagement means shaped for locking contact with said engagement means;

spring means biasing said complementary engagement means into a disengaged position relative to said engagement means under normal use conditions and for enabling engagement between said complementary engagement means and said engagement means upon application of tensional belt forces in excess of normal user retention forces of the type occurring during strong vehicle braking action and during a vehicle impact, said excessive tensional forces acting on said detent means so as to pull said complementary engagement means into said locking contact.

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**4,166,643**

## TRAIN OF CARBON COPY DUPLICATING FORM SETS FOR USE IN OFFICE MACHINES

**Jürg E. Fischlin, Rebweg 3, Erlenbach, Switzerland**

**Continuation of Ser. No. 616,268, Sep. 24, 1975, abandoned. This application Dec. 23, 1977, Ser. No. 863,701**

**Claims priority, application Switzerland, Sep. 24, 1974, 12894/74; Oct. 31, 1974, 14585/74**

**Int. Cl.² B41L *1/32***

**U.S. Cl. 282—11.5 A** **4 Claims**

1. A continuous train of carbon copy duplicating form sets for use in office machines comprising a continuous lowermost base sheet, a plurality of overlying sheet sets comprising longitudinally spaced vertical stacks of overlying sheets of the same kind and thickness as the base sheet which overlie said base sheet and are secured thereto at spaced locations along the length of said base sheet, each of said overlying sheets having a form imprinted on one face thereof and having a forward end and a rearward end, the uppermost one of said overlying sheets having an overlapping portion extending longitudinally in a rearward direction from said rearward end and overlying but not secured to the next adjacent overlying sheet set, said uppermost sheet with said overlapping portion being longer than the remaining overlying sheets of its associated stack, a first demarcation line extending across the widths of said overlying sheets and defining a head portion between said first demarcation line and said forward end, a second demarcation line extending across the widths of said uppermost sheet and defining an intermediate portion between said first and second demarcation line and defining said overhanging portion rearwardly of said uppermost sheet, said first and second demarcation lines also extending into said base sheet, fold lines extending across the width of said base sheet adjacent each intermediate portion, said sheets being separable along said first and second demarcation line, said continuous train being positionable in a vertical pile of said stacks with said form on each sheet facing the same direction.

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**4,166,644**

## PRESSURE-SENSITIVE RECORD MATERIAL CONTAINING UREA-FORMALDEHYDE RESIN PIGMENT

**Daniel J. Kay, and Rashmikant R. Patel, both of Appleton, Wis., assignors to NCR Corporation, Dayton, Ohio**

**Filed Jun. 21, 1977, Ser. No. 808,560**

**Int. Cl.² B41L *1/36***

**U.S. Cl. 282—27.5** **12 Claims**

1. A pressure-sensitive record sheet material comprising a first substrate having a coating of pressure rupturable capsules containing an oily solution of a colorless chromogenic dye precursor and in contiguous relationship therewith a second

substrate having a coating comprising kaolin clay, an oil-soluble zinc-modified phenol-formaldehyde resin, about 1 to 25% by weight of a substantially water-insoluble, cross-linked urea-formaldehyde agglomerated resin pigment having a mean agglomerate size of from about 2 to about 10 microns and a latex or starch binder therefor.

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**4,166,645**

## DOOR LATCHING APPARATUS FOR A VEHICLE DOOR

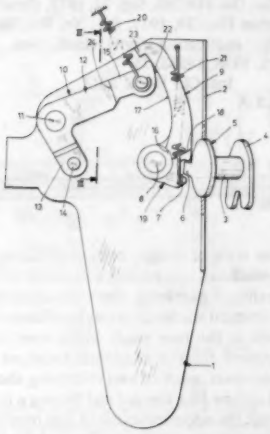
**Horst Klebba, Weyhausen, Fed. Rep. of Germany, assignor to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Fed. Rep. of Germany**

**Filed Jul. 3, 1978, Ser. No. 921,324**

**Claims priority, application Fed. Rep. of Germany, Aug. 20, 1977, 2737639**

**Int. Cl.² E05C *3/26***

**U.S. Cl. 292—216** **6 Claims**



1. In apparatus for latching a door, particularly a vehicle sliding door, said apparatus comprising:

(a) a turning latch rotatable between an open and a closed position;

(b) a pivot lever rotatable about a pivot shaft and having a fork, a first edge surface and a second edge surface, said first and second edge surfaces being adjacent and contiguous and forming an angle with respect to each other;

(c) a blocking lever connected to rotate with said turning latch, said blocking lever having a tab protruding into said fork of said pivot lever;

(d) a first spring biasing said pivot lever in a direction urging said blocking lever, and thereby said turning latch, into the open position;

(e) a movable operating lever having a contact area arranged in sliding contact with said first and second edge surfaces of said pivot lever, such that when said turning latch is in an open position, said contact area is in contact with said first edge surface thereby releasing said pivot lever, and when said turning latch is in a closed position, said contact area is in contact with said second edge surface, thereby locking said pivot lever; and

(f) a second spring biasing said operating lever in a direction urging said operating lever into the position locking said pivot lever;

the improvement wherein said first and second edge surfaces lie in a plane passing to one side of the end of the pivot shaft of said pivot lever; wherein said contact area of said operating lever is arranged in said plane and moves along a path, in the region of said pivot shaft, extending approximately radially with respect to the axis of said pivot shaft; and wherein said first edge surface of said pivot lever is adjacent said pivot shaft and extends, at least approximately, in a circular arc about said pivot shaft.

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**4,166,646**

## LATCHING PLATE ESPECIALLY FOR AUTOMOBILE DOORS

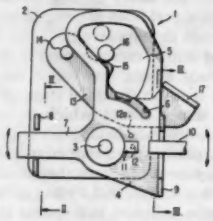
**Michel Ménard, Beynes; Robert Cherbourg, Bueil, and Jean P. Falluel, Pierrelaye, all of France, assignors to Regie Nationale des Usines Renault, Boulogne-Billancourt, France**

**Filed Jun. 17, 1977, Ser. No. 807,641**

**Claims priority, application France, Jun. 18, 1976, 76 18609**

**Int. Cl.² E05C *13/00***

**U.S. Cl. 292—336.3** **10 Claims**



1. A door locking device for an automobile which comprises:

a support on the automobile door;

a locking lever pivotably mounted on said support, being movable in a first direction for locking said door and movable in a second direction, opposite the first, for unlocking and opening said door;

a first control lever attached to said automobile cooperable with said locking lever for moving said locking lever selectively in either said first direction or said second direction;

a locking bolt cooperable with said locking lever for moving said locking lever selectively in either said first direction or said second direction; and

means for moving said locking lever in said second direction responsive to the closing of said door wherein said locking lever can be held in a neutral or locking position by a spring with two stable positions.

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**4,166,647**

## APPARATUS FOR POSITIONING HEAVY ROLLS AND THE LIKE

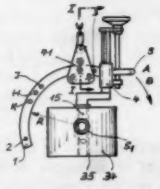
**Adolf G. Schmidt, Munsterweg 24, Düren-Birgel, Fed. Rep. of Germany (D-5160)**

**Filed Apr. 7, 1977, Ser. No. 785,535**

**Claims priority, application Fed. Rep. of Germany, Oct. 27, 1976, 2648665**

**Int. Cl.² B66C *1/34***

**U.S. Cl. 294—78 A** **16 Claims**



1. Apparatus for positioning an object, comprising a swivel mechanism having:

guidance means;

a circularly bent roll bracket movably mounted on said

guidance means for movement relative thereto about the center of curvature of said roll bracket;

a clamping device adapted to receive an object to be positioned; and

means shiftably mounting said clamping device on said roll bracket, whereby said clamping device, and thereby the associated object received thereon, is shiftable with respect to said roll bracket so that the common center of gravity of said swivel mechanism and the associated object to be positioned can be shifted, to an extent depending on the size and shape of the associated object, to coincide with the center of curvature of said roll bracket.

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**4,166,648**

## VACUUM LIFTING APPARATUS

**Jacob J. Creskoff, 200 N. Wynnewood Ave., Wynnewood, Pa. 19096**

**Filed Sep. 26, 1977, Ser. No. 836,788**
**Int. Cl.² B66C 1/02**
**U.S. Cl. 294—64 R** **13 Claims**

1. A vacuum lifting apparatus for lifting an object having a generally continuous surface portion which comprises a frame member having at least one generally continuous surface portion, compressible cellular resilient gasket means having a generally peripheral configuration partially secured along inner peripheral portions thereof to at least a part of said surface portion of said frame member to define an open chamber, means for communicating said chamber with a source of relatively reduced pressure such that when said gasket means is positioned against at least a part of the generally continuous surface portion of the object, and the atmospheric pressure therebetween is reduced to provide an atmospheric attachment between said frame member and the object, the resilient compressibility of said cellular gasket means and the unsecured portions of said gasket means combine to provide substantial atmospheric sealing between said frame member and the object.

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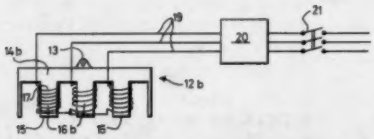
**4,166,649**

## DEVICE FOR REMOVING WORKPIECES FROM A CONTAINER

**Herbert Scholl, Buchenrain 149, D 7320 Göppingen-Ursenwang, Fed. Rep. of Germany, assignor to Herbert Scholl, Göppingen-Ursenwang, Fed. Rep. of Germany**

**Filed Nov. 8, 1977, Ser. No. 849,644**
**Claims priority, application Fed. Rep. of Germany, Nov. 16, 1976, 2652188**
**Int. Cl.² B66C 1/04**
**U.S. Cl. 294—65.5** **9 Claims**




1. Apparatus for transferring ferro-magnetic workpieces comprising a carrier having a plurality of magnets at least one of which is a wound A-C magnet and a power supply system, comprising a source of current and means for selectively exciting said magnets to hold said workpieces thereto and for reducing the excitation of said magnets to permit said workpieces to fall therefrom, including means for the time controlled variation of the excitation of said A-C magnet during the fall of said workpieces to gradually reduce the amplitude of the magnetic field produced in the locus of said falling workpieces to thereby demagnetize said workpieces.

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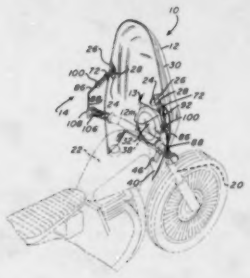
**4,166,650**

## BREAKAWAY HANDLEBAR-MOUNTED MOTORCYCLE FAIRING

**Charles A. Saunders, IV, P.O. Box 1246, Columbus, Nebr. 68601**

**Filed Sep. 1, 1977, Ser. No. 829,638**
**Int. Cl.² B62J 17/04**
**U.S. Cl. 296—78.1** **12 Claims**




1. The motorcycle fairing which comprises: a generally pear-shaped concavo-convex clear transparent impact-resistant windscreen having a cutout along the bottom edge thereof sized and adapted to receive the steerable fork mounting the front wheel; a pair of strut means depending from the opposite side margins of the windscreen connectable to the motorcycle handlebars; means comprising a first quick-disconnect coupling carried by each of said strut means for detachably connecting same to one of said windscreen and handlebar members; bracket means carried by the windscreen alongside the cutout therein for attaching the latter to the steerable fork; and means comprising a second quick-disconnect coupling carried by the bracket means for detachable connecting same to one of said windscreen and fork members, said first and second quick-disconnect couplings being operative to uncouple and release the fairing from the motorcycle upon application of an impact blow of a predetermined magnitude to the rear face thereof.

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**4,166,651**

## VEHICULAR MIRROR ASSEMBLY AND PIVOT SUPPORT ASSEMBLY THEREFOR

**Wayne Vandenbrink; Philip D. Stegenga, both of West Olive, and Richard D. Hutchinson, Jr., Holland, all of Mich., assignors to Donnelly Mirrors, Inc., Holland, Mich.**

**Filed Aug. 5, 1977, Ser. No. 822,085**
**Int. Cl.² A47G 1/24**
**U.S. Cl. 296—84 B** **28 Claims**

1. A vehicular mirror assembly adapted for pivoting with respect to a shaft comprising:

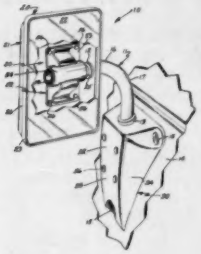
a housing having an access opening for receiving the shaft;

a pivot support assembly for pivoting coupling the shaft to said housing;

said pivot support assembly including a clamping aperture axially aligned with said access opening, a first and a second coacting journal bearing members at least partially defining said clamping aperture, said members acting on the shaft from opposite directions to clampingly support the shaft, and coupling means for connecting at least one of said first and second journal bearing members to said housing;

said first journal bearing member being positioned around at least a portion of the circumference of the shaft and having at least one opening therethrough for admitting said

second journal bearing member to apply a clamping pressure on the shaft; said second journal bearing member extending through said opening in said first journal bearing member and interengaged therewith, resting against a portion of said first



journal bearing member; the interengagement of said first and second journal bearing members being adapted to confine the shaft therebetween and, together with said spring means, resist rotation of the shaft independently of said coupling means; and

said housing at least partially enshrouding said pivot support assembly thereby providing a weather barrier for said assembly.

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**4,166,652**

## MINING MACHINE, PARTICULARLY FOR THE WORKING OF LOW MINE SEAMS

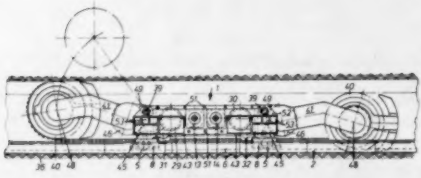
**Klaus Oberste-Beulmann, Sprockhovel; Herbert Schupphaus, Bochum; Karl-Heinz Borowski, Bochum; Willy Lanfermann, Bochum, and Friedhelm Henrich, Bochum, all of Fed. Rep. of Germany, assignors to Gebr. Eickhoff Maschinenfabrik und Eisengiesserei m.b.H., Bochum, Fed. Rep. of Germany**

**Filed Jul. 10, 1978, Ser. No. 922,951**

**Claims priority, application Fed. Rep. of Germany, Jul. 16, 1977, 2732275**

**Int. Cl.[2] E21C *35/12***

**U.S. Cl. 299—43** **15 Claims**



1. A drum cutter-loader machine for working a mine seam particularly a thin mine seam while moving along the winning zone thereof adjacent the working face side of a face conveyor which includes a machine support track along the working face side and a guide bar along the stow side, said drum cutter-loader machine including the combination of:

a gantry casing supported by said guide bar while straddling said face conveyor,

winch drive motors carried by said gantry casing with the rotational axes of the motors extending transversely to said face conveyor,

a transmission box joined to the working face side of said gantry casing to extend above said machine support track, said transmission box having openings to receive said winch drive motors,

rollers engaging said machine track to support said transmission box at the working face side of said face conveyor,

a winch casing joined to the working face side of said transmission box,

drum cutter support arms extending from opposite end faces of said transmission box substantially above the conveyor wall at the working face side of said face conveyor for vertical displacement,

a pivot to mount each of said drum cutter support arms to said winch casing,

a cutter drum on the extended end of each of said drum cutter support arms for working the mine seam, and

drum drive motors each carried by one of said drum cutter support arms between the cutter drum mounted thereon and said winch casing.

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**4,166,653**

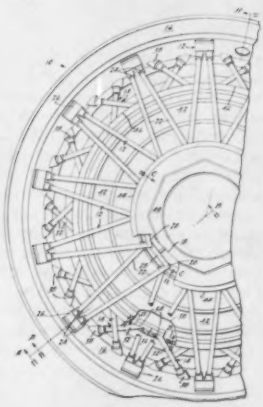
## SIMULATED WIRE WHEEL TRIM

**Robert E. Claucherty, Jackson, Mich., assignor to Norris Industries, Inc., Ypsilanti, Mich.**

**Filed Feb. 22, 1977, Ser. No. 771,005**

**Int. Cl.[2] B60B *7/04***

**U.S. Cl. 301—37 SS** **25 Claims**



1. In a simulated wire wheel cover comprised of an inner element and an outer element, the improvement comprising:

a plurality of integrally formed, identical spoke clusters extending between and secured by said inner element and said outer element, each of said spoke clusters comprised of two generally radially extending simulated spokes joined at their radially inner ends by a generally circumferentially extending connecting rib, one end of each said connecting rib being partially disposed on top of the adjacent connecting rib, and the opposite end of each said connecting rib being partially disposed beneath the adjacent connecting rib, whereby said clusters form two rows of spokes in axially spaced conical planes.

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**4,166,654**

## VEHICLE BRAKING SYSTEM

**Michael P. Snodgrass, 604 Dudley St., Blanchester, Ohio 45107**

**Filed Feb. 24, 1977, Ser. No. 771,556**

**Int. Cl.[2] B60T *11/18***

**U.S. Cl. 303—14** **28 Claims**

1. A vehicle braking system comprising

a brake actuating cylinder at a wheel of the vehicle, said cylinder actuable through application of pressurized fluid thereto to operate a brake mechanism of the wheel,

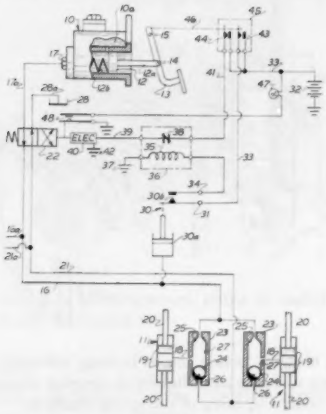
a master brake cylinder including a piston having a brake pedal connected thereto and selectively operable within

said master brake cylinder to effect application of pressurized fluid in the brake system,

a first fluid circuit connected between said master cylinder and said brake actuating cylinder,

a second fluid circuit connected between said master cylinder and said brake actuating cylinder, and

a solenoid operated valve interconnected in said first and second circuits and normally in a first position connecting said first circuit in fluid communicating relationship between said master cylinder and brake actuating cylinder, a fluid pressure responsive switch operative independently



of displacement of said brake pedal to any predetermined position and responsive to fluid pressure in said first circuit, a fluid pressure responsive circuit connected to said fluid responsive switch and interconnected with said solenoid operated valve to operate said valve to a second position when said master cylinder piston is displaced to alternatively connect said second circuit in fluid communicating relationship between said master cylinder and brake actuating cylinder when fluid pressure in said first circuit does not increase to at least a predetermined minimum value.

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**4,166,655**

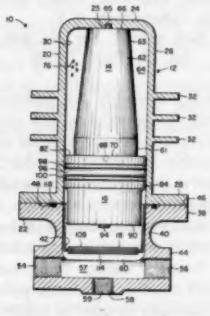
## APPARATUS FOR EQUALIZING PRESSURE AND ABSORBING SHOCK IN A PNEUMATIC BRAKING SYSTEM

**Theodore P. Spero, 1751 Ellis St., Concord, Calif. 94520**

**Filed Oct. 17, 1977, Ser. No. 842,474**

**Int. Cl.[2] B60T** *17/04;* **F16L** *55/04*

**U.S. Cl. 303—87** **26 Claims**



1. Apparatus for equalizing pressure and absorbing shock in a braking system including a pneumatic source coupled by air lines to two brake actuators, such system being subject to the pressure of contaminants of the water droplet and particulate type, said apparatus comprising:

a walled housing including an inner surface forming an elongated cavity having a first port for connection to the pneumatic source and a second port for connection to one of the actuators;

first means disposed in said cavity to form a first chamber communicating with said first and second ports, and a second chamber, said first means including a rigid piston having a first end and an opposed second end, and an elongated resiliently yieldable, shock absorbing member disposed within said cavity, said member having an outer surface and a transverse cross-sectional dimension less than the corresponding transverse cross-sectional dimension of said cavity such that the separated outer surface of said member and inner surface of said housing form said second chamber; and

second means extending from the periphery of said inner surface and over said first end, said second means serving to seal said piston, member and second chamber from the contaminants, whereby an increase in pneumatic pressure in said first chamber is transmitted through said second means to said piston, causing said piston to deform said member into said second chamber.

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**4,166,656**

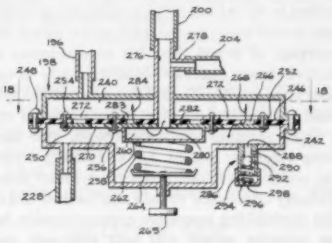
## FLUID OPERATED MODULATING VALVE

**Laddie A. Depas, Sr., Louisville, Ky., assignor to Maurice L. Miller and Harold W. Thomas, part interest to each**

**Filed Jun. 8, 1977, Ser. No. 804,614**

**Int. Cl.[2] B60T** *15/02;* **F16K** *15/14*

**U.S. Cl. 303—115** **4 Claims**



1. A fluid operated modulating valve comprising

a housing,

a diaphragm assembly disposed in said housing to form a partition therein defining a first and second fluid chamber on opposite sides of said partition, said diaphragm assembly comprising

a flexible diaphragm member, and

first and second rigid members disposed on opposite sides of said flexible member facing said first and second chambers, respectively, said members being rigidly interconnected,

means for introducing a fluid, under pressure, into said first chamber, and

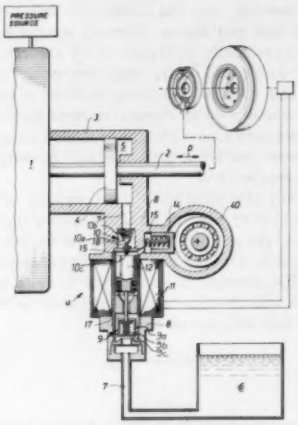
means for venting a fluid from said first chamber through all of said members into said second chamber when the pressure in said first chamber is greater than the pressure in said second chamber, and for maintaining fluid tight separation between said chambers when the pressure in said first chamber is less than the pressure in said second chamber.

4,166,657

## BRAKE ACTUATING AND RELIEVING STRUCTURE

Folke I. Blomberg, Duvstigen 4, S-181 40 Lidingo, and Jan-Olov M. Holst, Skogsduvevagen 14, S-75252 Uppsala, both of Sweden

Continuation of Ser. No. 658,777, Feb. 17, 1976, abandoned.
This application Jul. 15, 1977, Ser. No. 815,908
Claims priority, application Sweden, Feb. 19, 1975, 7501883
Int. Cl.[2] B60T 8/02
U.S. Cl. 303—116 11 Claims



1. In apparatus for braking a rotating member which has brake means, pneumatically actuated wheel chamber means for applying to said brake means braking force which retards rotation of the rotating member and including a mechanical linkage directly connected to said brake means and to said chamber means for transmitting braking force from said chamber means to said brake means, and sensor means for signalling the occurrence of wheel slip, that improvement which comprises motive means operative independently of said chamber means and connected with said mechanical linkage for applying to said mechanical linkage relieving force opposing the braking force transmitted therethrough, said motive means comprising reservoir means for containing hydraulic fluid, hydraulic pressure actuated relieving cylinder means having a piston directly connected to said mechanical linkage, conduit means for establishing operative communication between said relieving cylinder means and said reservoir means, pump means interposed in said conduit means for pumping hydraulic fluid from said reservoir means to said relieving cylinder means, and control valve means interposed in said conduit means for normally accommodating free flow of hydraulic fluid from said reservoir to said relieving cylinder means and from said relieving cylinder means to said reservoir means, said control valve means being responsive to said sensor means for controllably blocking flow of hydraulic fluid from said relieving cylinder means and thereby cooperating with said pump means for generating relieving force.

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4,166,658

## SPHERICAL BEARING ASSEMBLY WITH SNAP-IN SWIVEL CONTACT CAPABILITY

Kenneth H. B. Glass, Cambridge, Canada, assignor to Electrohome Limited, Kitchener, Canada

Filed Mar. 17, 1978, Ser. No. 887,663
Int. Cl.[2] F16C 23/00
U.S. Cl. 308—15 5 Claims

1. A self-aligning bearing assembly for a motor, comprising:

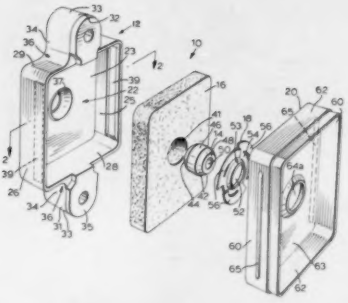
a housing member defining a bearing seat within a recess cavity which is larger than the bearing seat, the recess cavity being defined in part by two opposed side wall portions,

a spherical bearing seated in said seat,

porous oil-retaining means surrounding said bearing and within said recess cavity,

a spring element having a central opening in contact with the spherical bearing,

and a closure member for the recess cavity, the closure member including side partitions adapted to be overlapped by said side wall portions of the housing member, and a main wall bridging between the side partitions, the



spring element having means bearing outwardly against the main wall, the latter having an opening corresponding to the central opening of the spring element,

each side wall portion and its corresponding side partition having a snap-fit construction in which one of them defines an elongate rib projecting toward the other, while the other defines an elongate recess for receiving the rib, the rib and the recess each having its own respective width, the width of the elongate recess being greater than the width of the rib, thereby to permit the closure member to swivel with respect to the housing member in planes parallel and perpendicular to the direction of the rib.

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4,166,659

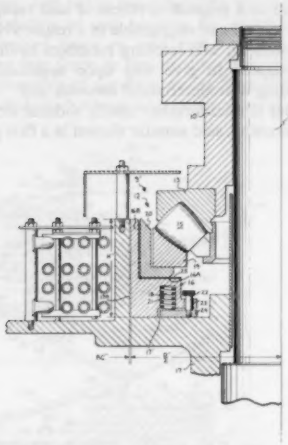
## THRUST BEARING ASSEMBLY

Robert F. Gleichman, San Jose, Calif., assignor to General Electric Company, Schenectady, N.Y.

Filed Nov. 4, 1977, Ser. No. 848,677
Int. Cl.[2] F16C 19/10
U.S. Cl. 308—175 14 Claims

1. A thrust bearing assembly for positioning a spherical roller thrust bearing in alignment with a rotatable shaft supported by said bearing, comprising, a thrust collar mounted on the shaft and rotatable therewith, a spherical roller thrust bearing having annular shaft and housing washers and a plurality of convexly tapered rollers mounted for rotation between said washers, said shaft washer being seated against the thrust collar, an annular chair member having a back portion and a seat portion, said housing washer being seated on the seat portion of said chair member, the back portion of the chair member being substantially greater in height at its peripheral outer surface than the height of said housing washer, the height of said back portion being no less than one-fifth of the outer diameter of the chair member, and a supporting body having

an inner cylindrical surface for limiting movement of the outer peripheral surface of the back portion of said chair member to



retain it within a predetermined range of radial clearance relative to said supporting body.

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**4,166,660**

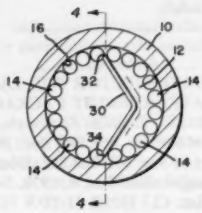
## ROLLER ASSEMBLY WITH ROLLER RETENTION SPRING

**William W. Murphy, Goshen, Conn., assignor to The Torrington Company, Torrington, Conn.**

**Filed Oct. 10, 1978, Ser. No. 949,782**

**Int. Cl.[2] F16C *19/22, 43/04***

**U.S. Cl. 308—202** **8 Claims**




1. A roller assembly comprising: a body with a cylindrical bore; rollers extending lengthwise inside the bore and disposed along side and abutting one another in the bore so as to form a substantially closed circle of rollers; and a roller retention mechanism consisting of only a spring including a portion located in a space between two adjoining rollers and adapted to push these rollers apart circumferentially to keystone all the rollers and thus to press all the rollers against the wall of the bore with sufficient force to prevent axial movement of the rollers and to retain the rollers in the body.

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**4,166,661**

## BEARING RETAINER

**Richard L. Hedgcock, East Peoria, and Arthur J. Ritter, Jr., Metamora, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.**

**Continuation of Ser. No. 800,823, May 26, 1977, abandoned. This application Oct. 11, 1978, Ser. No. 950,421**

**Int. Cl.[2] F16C *35/00***

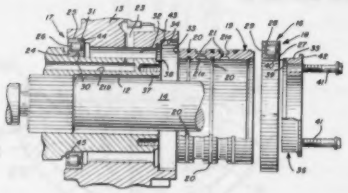
**U.S. Cl. 308—207 R** **11 Claims**

1. In a drive assembly having a hub member, and an annular outer member, improved means for rotatably mounting said outer member coaxially about the hub member comprising:

an annular axially inner bearing having an inner race press mounted on said hub member and an outer race mounted to said outer member;

an annular axially outer bearing;

a bearing retainer having an annular bearing surface coaxially disposed within said outer member, said outer bearing comprising a roller bearing having radially inner and outer races, said outer bearing inner race being press mounted solely onto said annular bearing surface of said bearing retainer and said outer bearing outer race being mounted in said outer member;



a sleeve member disposed coaxially between said hub member and outer member;

annular sealing means coaxially on said sleeve member for sealing said sleeve member to said hub member and outer member axially intermediate said bearings, said sleeve member being axially captured between said inner bearing inner race and said outer bearing inner race whereby said sleeve may be removed from between said hub member and outer member for servicing said sealing means upon removal of said bearing retainer with said outer bearing inner race while said outer bearing outer race is maintained mounted in said outer member; and

securing means for removably securing said bearing retainer coaxially to said hub member.

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**4,166,662**

## SHELL TYPE RACE FOR THRUST ROLLER BEARING

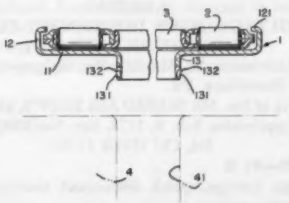
**Moichi Chiba, Yokosuka; Hideo Ouchi, Sagamihara, and Toshio Suzuki, Chigasaki, all of Japan, assignors to The Torrington Company, Torrington, Conn.**

**Filed Apr. 17, 1978, Ser. No. 896,975**

**Claims priority, application Japan, May 10, 1977, 52-58303[U]**

**Int. Cl.[2] F16C *33/58***

**U.S. Cl. 308—235** **1 Claim**




1. A shell type race for a thrust roller retainer comprising at least a planar race wall on which rollers in the retainer may roll, and an outer peripheral wall for guiding the retainer is formed with a restraining portion engageable with the outer peripheral edge portion of said retainer to prevent said retainer from slipping out and an axially extending, cylindrical wall is adapted to be inserted and located in an opening in a housing, the outer surface of said cylindrical wall having a plurality of individual resilient tongues projecting outwardly so as to be open toward said race wall with the end edge of said individual

resilient tongues on said cylindrical wall of said race formed so as to bite into the wall formed by said opening in said housing.

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**4,166,663**

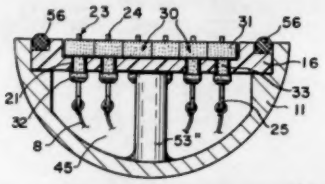
## MULTI-CONTACT CONNECTORS WITH INDIVIDUAL RESILIENT CONTACT INSERTS

**Garland H. Walker, and Ernest M. Hall, Jr., both of Houston, Tex., assignors to Western Geophysical Co. of America, Houston, Tex.**

**Continuation of Ser. No. 740,913, Nov. 11, 1976, abandoned, Continuation-in-part of Ser. No. 606,903, Aug. 22, 1975, abandoned. This application Apr. 28, 1978, Ser. No. 900,846**

**Int. Cl.[2] H01R** *13/42, 23/20*

**U.S. Cl. 339—49 B** **5 Claims**




1. In a cable connector assembly for detachably connecting two multiple conductor cables, the improvement comprising:

a pair of identical half-housings;

a pair of bases, having a top portion and a bottom portion and defining a plurality of bores that extend between said top and bottom portions;

each said base supported by each said half-housing which encloses the bottom portion of the corresponding base and exposes the top portion thereof;

a plurality of contact inserts individually removably insertable from above said bases in each said bore, each said resilient contact insert including a contact blade sealingly embedded therein, each said contact blade having an elongate blunt knife-edged contact end face at one end that protrudes above said resilient contact insert, each said contact insert further including a shoulder for sealing a corresponding bore when said shoulder abuts the top portion of said base and for urging said contact blade axially away from said top portion; and

means for coupling said pair of half housings together so that the contact end faces of the contact blades in the opposite half housings axially inosculate in hermaphroditic mating engagement.

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**4,166,664**

## HIGH VOLTAGE QUICK DISCONNECT ELECTRICAL CONNECTOR ASSEMBLY

**Henry O. Herrmann, Jr., Mt. Joy, Pa., assignor to AMP Incorporated, Harrisburg, Pa.**

**Continuation of Ser. No. 544,032, Jan. 24, 1975, abandoned. This application Feb. 9, 1978, Ser. No. 876,582**

**Int. Cl.[2] H01R** *13/54*

**U.S. Cl. 339—91 R** **6 Claims**

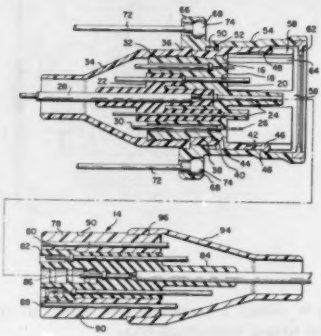
1. A high voltage, quick disconnect electrical connector assembly, comprising:

a plug member having a housing with a plurality of low voltage electrical terminals mounted therein in a patterned array, a high voltage insert containing high voltage terminals and mounted in said housing amid said array, and at least one detent on the outer surface of said plug member;

a receptacle member having a housing with a plurality of low voltage terminals mounted therein in a like patterned array, a high voltage insert containing high voltage terminals and mounted in said receptacle housing amid said array aligned for mating with said high voltage insert of said plug member and at least one recess on an outer surface of said receptacle member;

at least one latching member each having a first end fixedly secured in a respective recess of said receptacle housing and a second end engageable in a respective detent in said plug housing, said latching members having a neck portion adapted to give way upon application of a force exceeding a predetermined amount; and

an annular shroud member axially slidable along said receptacle housing, said annular shroud in a first position allowing said latching members to lie in a normal position opening said receptacle for reception of said plug and in a second position biasing said latching members to a condition in which they engage in said detents, and an annular seal on a free end of said shroud forming a wiping sealing engagement with said plug during mating and unmating of said assembly whereby any arcing is contained within the assembly and a long arc path is defined by said high voltage inserts together and said array of low voltage terminals so that said assembly can be used in an explosive environment in safety.



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**4,166,665**

## LIQUID COOLED CONNECTOR FOR LARGE SCALE INTEGRATED CIRCUIT PACKAGES

**John M. Cutchaw, 7333 E. Virginia, Scottsdale, Ariz. 85257**

**Continuation-in-part of Ser. No. 862,582, Dec. 20, 1977, which is a continuation-in-part of Ser. No. 754,365, Dec. 27, 1976, Pat. No. 4,063,791. This application Jun. 8, 1978, Ser. No. 913,871**

**Int. Cl.[2] H01R** *13/00*

**U.S. Cl. 339—112 L** **22 Claims**

1. A liquid cooled connector for removably mounting a leadless circuit package onto a backpanel and electrically coupling the terminal pads of the leadless circuit package to the backpanel, said connector comprising:

(a) a housing mountable on the backpanel and having endless upstanding side walls which form the perimeter of an upwardly opening chamber into which the circuit package is nestingly positionable;

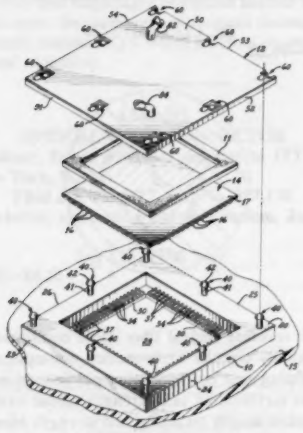
(b) electrical interconnecting means in said housing and extending into the chamber thereof for engaging the terminal pads of the leadless circuit package when that package is positioned therein and extending from said housing for engaging the backpanel when said housing is mounted thereon;

(c) a plurality of stud means mounted on said housing in substantially evenly spaced increments so as to be upstanding from each of the side walls thereof in an array which surrounds the chamber of said housing;

(d) a resilient gasket positionable in the chamber of said housing on top of the circuit package when that package is positioned therein, said gasket disposed to extend above the side walls of said housing;

(e) a cover positionable above said housing in overlaying

relationship with respect to the side walls thereof and in engagement with the extending portion of said gasket when said gasket and the circuit package are positioned in said housing, said cover being laterally and downwardly movable relative to said housing for exerting a downwardly directed force on said gasket with said gasket transferring that force to the circuit package, said cover having a plurality of aperture means formed therein for receiving said stud means when said cover is positioned



above said housing and for removably holding said cover in the laterally and downwardly moved position thereof;

(f) said gasket of endless ring shaped configuration to form a sealed chamber within the confines thereof with the bottom of said sealed chamber being formed by the circuit package when the package is positioned in said housing and the top of said sealed chamber being formed by said cover; and

(g) means in said cover through which liquid coolant is circulatingly suppliable to said sealed chamber.

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**4,166,666**

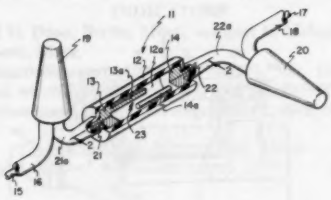
**CONNECTOR**

**George F. Reese, P.O. Box 542, West Jordan, Utah 84084**

**Filed Jan. 23, 1978, Ser. No. 871,650**

**Int. Cl.[2] H01R *3/04***

**U.S. Cl. 339—118 R** **13 Claims**



1. A connector comprising,

a housing formed from an electrically non-conductive material having a cavity formed therein with opposite ends thereof closed off by electrically conductive metal bases;

electrical contacts, each extending at a normal angle and off-center from one said base, said contact and base formed of the same conductive metal, said contacts extending into said housing cavity parallel to and alongside each other over portions of each of their lengths;

means for electrically connecting an electrically conductive wire end to a base and contact all formed of a like electrically conductive metal; and

an electrically conductive fluid medium contained within said housing cavity.

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**4,166,667**

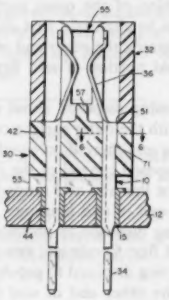
**CIRCUIT BOARD CONNECTOR**

**Wendell L. Griffin, Warren, Pa., assignor to GTE Sylvania, Incorporated, Stamford, Conn.**

**Filed Apr. 17, 1978, Ser. No. 893,361**

**Int. Cl.[2] H05K *1/07***

**U.S. Cl. 339—176 MP** **8 Claims**



1. An electrical connector for providing electrical connection for one board of the type having conductive strips thereon and another board of the type having a plurality of through holes comprising: a mounting member having a plurality of rectangular apertures therein, each aperture having an end wall and corners facing said end wall; a plurality of electrical contacts, each contact including a flat contact portion at one end for contacting conductive strips on one circuit board, an arcuate C-shaped section at the other end and a portion intermediate said flat contact portion and said C-shaped section, said C-shaped section being tapered outwardly to said intermediate portion, said intermediate portion having a substantially uniform non-linear cross-section including a projecting portion between straight terminal edge portions, said edge portions being sprung outwardly and abutting respective corners and said projecting portion being sprung inwardly and abutting said end wall for accurately aligning and firmly holding said contact to said mounting member, said contacts having respective C-shaped sections projecting outwardly from said mounting member adapted for insertion into respective holes of said other board.

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**4,166,668**

**FIBER OPTIC ARRANGEMENTS**

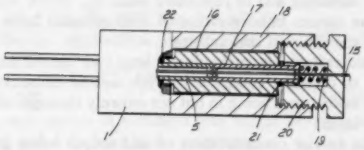
**Alexander MacLeod, Leeds, England, assignor to International Standard Electric Corporation, New York, N.Y.**

**Filed Nov. 30, 1977, Ser. No. 856,070**

**Claims priority, application United Kingdom, Dec. 14, 1976, 52111/76**

**Int. Cl.[2] G02B *5/14***

**U.S. Cl. 350—96.20** **4 Claims**



1. An arrangement for mounting a surface-acting solid state device and for coupling said device to a first optical fiber transmission line comprising:

a sealed enclosure in which said device is mounted;

a second optical fiber transmission line mounted axially in a first ferrule, said first ferrule extending in a sealed relationship through said enclosure to place said second line in an aligned relationship with said device and to place one end of said second line in a coupled relationship with said device, said first ferrule having a given outer diameter;

a second ferrule supporting axially thereof a portion of said first line, said second ferrule having an outer diameter equal to said given diameter;

a metal tube having a precision bore therein, the inner surface of said bore being in direct, close fitting contact with at least a portion of the outer surface of said first and second ferrules to align said first and second lines and to assist in maintaining the other end of said second line and one end of said portion of said first line in an abutting relationship;

a cylindrical housing disposed about and in a loose fitting relationship with the outer surface of said tube, said housing having one end thereof screwed into said enclosure;

a locking nut disposed coaxial of the other end of said portion of said first line and said second ferrule and screwed into the other end of said housing;

a first sealing ring disposed to provide a seal between said enclosure, said first ferrule and one end of said tube;

a second sealing ring disposed to provide a seal between said locking nut, the other end of said tube and said second ferrule; and

a spring disposed coaxial of said other end of said portion of said first line and between the adjacent end of said second ferrule and said locking nut to further assist in maintaining said other end of said second line and said one end of said portion of said first line in said abutting relationship.

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**4,166,669**

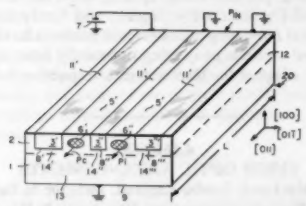
## PLANAR OPTICAL WAVEGUIDE, MODULATOR, VARIABLE COUPLER AND SWITCH

**Frederick J. Leonberger, and Joseph P. Donnelly, both of Carlisle, Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.**

**Filed May 13, 1977, Ser. No. 796,787**

**Int. Cl.[2] G02B *5/14***

**U.S. Cl. 350—96.14** **29 Claims**



1. A passive planar three dimensional optical waveguide that has a planar structure comprising,

a semiconductor substrate of one conductivity type of refractive index $n_1$,

an epitaxial layer of the same conductivity type on said substrate and of refractive index $n_2$,

the carrier concentration of said epitaxial layer being less than that of said substrate,

said epitaxial layer having at least two spaced doped stripes of opposite conductivity type and of refractive index $n_3$, said stripes being in but not entirely through said epitaxial layer,

the carrier concentration of said stripes being greater than that of said epitaxial layer,

a medium in contact with the surface of said epitaxial layer whose refraction index is $n_4$,

the magnitude of the refraction indices being $n_2 > n_1$; $n_2 > n_3$; $n_1$, $n_2$, and $n_3$, each $> n_4$,

the $n_2$ region of said layer between said spaced stripes forming said optical waveguide.

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**4,166,670**

## OPTICAL FIBER CABLE

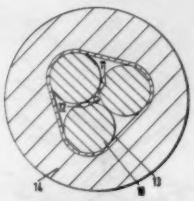
**Melvin M. Ramsay, Harlow, England, assignor to International Standard Electric Corporation, New York, N.Y.**

**Filed Jul. 18, 1977, Ser. No. 816,383**

**Claims priority, application United Kingdom, Jul. 27, 1976, 31233/76**

**Int. Cl.[2] G02B *5/16***

**U.S. Cl. 350—96.23** **1 Claim**



1. A crush resistant optical fiber cable comprising at least three substantially circular cross-section non-optical strength members defining one or more tricuspid interstices therebetween, means surrounding said strength means over substantially their entire length retaining said strength members in a close-packed assembly in which each said strength member contacts the strength members immediately adjacent thereto, and a single optical fiber being loosely mounted in at least one of said interstices.

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**4,166,671**

## APPARATUS FOR SIMULTANEOUS ADJUSTMENT OF THE POSITION AND APERTURE OF A MICROSCOPE FIELD STOP

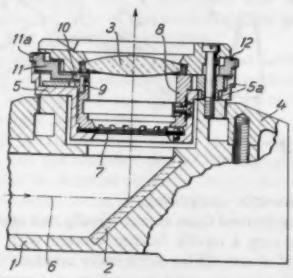
**Robert Lisfeld, Ulmtal, Ulm; Karl Wieber, Asslar, and Hans-Werner Stankewitz, Steindorf, all of Fed. Rep. of Germany, assignors to Ernst Leitz Wetzlar GmbH, Wetzlar, Fed. Rep. of Germany**

**Filed Jun. 15, 1977, Ser. No. 806,613**

**Claims priority, application Fed. Rep. of Germany, Jun. 16, 1976, 2626872**

**Int. Cl.[2] G02B *21/08***

**U.S. Cl. 350—87** **9 Claims**



1. Apparatus for use with a diaphragm having a variable aperture and forming a field stop in a microscope substage illuminator for adjusting the position and aperture of said diaphragm relative to an optical axis of said illuminator, comprising:

(a) a diaphragm carrier for slidably mounting said dia-

phragm upon said illuminator for free movement thereon in a plane normal to the optical axis of said illuminator;

(b) an annular element rotatably seated on said carrier which engages said diaphragm for adjusting the aperture of said diaphragm; and

(c) control means frictionally mounted to said illuminator, which is both rotationally and transversely movable relative to said optical axis which engages both said carrier and said annular element for adjusting the aperture of said diaphragm upon the rotational movement thereof and the position of said diaphragm in a plane normal to said optical axis upon the transverse movement thereof, said control means maintaining a stable position by means of said frictional mounting.

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**4,166,672**

## OPTICAL FIBER CONNECTOR

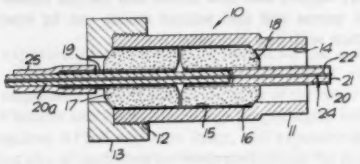
**Alan R. Gilbert, Essex, England, assignor to ITT Industries, Inc., New York, N.Y.**

**Filed Jul. 20, 1977, Ser. No. 817,176**

**Claims priority, application United Kingdom, Jul. 27, 1976, 31229/76**

**Int. Cl.[2] G02B 5/14**

**U.S. Cl. 350—96.20** **4 Claims**




1. An optical fiber termination adapted to be fitted to the stripped end of a single plastic clad fiber comprising:

a tubular housing having a forward end;

first and second cylindrical plastic inserts mounted end-to-end in said housing spaced behind said forward end and each carrying a respective sleeve member;

said sleeve members being coaxial and adapted to have a sliding fit on the plastic cladding on the fiber; and

one said sleeve member having a fusible metal insert formed with an elongated bore dimensioned to slidably receive the bared end of the fiber.

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**4,166,673**

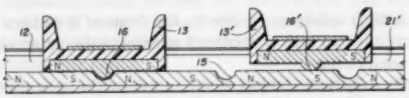
## SIGNAL DEVICE HAVING ADJUSTABLE CODING INDICATORS

**Raymond D. Dona, Berlin, Mass., assignor to Mekontrol, Inc., Northboro, Mass.**

**Continuation-in-part of Ser. No. 741,601, Nov. 15, 1976, abandoned, which is a continuation of Ser. No. 587,437, Jun. 16, 1975, abandoned. This application Jan. 17, 1978, Ser. No. 870,111**

**Int. Cl.[2] G02B 5/124; G01N 21/30**

**U.S. Cl. 350—97** **22 Claims**




1. Signal device, comprising:

(a) a track of an extruded U-shaped cross-section with a bottom wall and two spaced, parallel side walls, the bottom wall having a track surface adjacent each side wall,

(b) an indicator slidable in the track and having an inner surface facing the bottom wall of the track, a strip of the inner surface along each side wall engaging a corresponding track surface of the track,

(c) an elongated magnetic element embedded in the bottom wall of the track and having alternating magnetic poles located at discrete positions along its length, and

(d) a magnetic element embedded in the indicator at said inner surface,

a series of notches formed in the track surfaces at said discrete positions and a protuberance formed along each edge of the inner surface of the indicator for engagement with one of said notches on occasion, whereby the magnetic elements attract when the indicator is located at a discrete position and the magnetic elements repel when the indicator is located between discrete positions.

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**4,166,674**

## OBJECTIVE LENS SYSTEM FOR MICROSCOPES

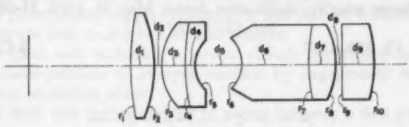
**Tsutomu Tojyo, Hachiouji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed Jan. 24, 1978, Ser. No. 871,977**

**Claims priority, application Japan, Jan. 29, 1977, 52-9128**

**Int. Cl.[2] G02B 21/02**

**U.S. Cl. 350—175 ML** **8 Claims**




1. An objective lens system for microscopes comprising a first positive lens component, a second meniscus lens component, a third negative cemented doublet meniscus lens component and a fourth positive lens component, and said lens system satisfying the conditions enumerated hereunder:

(1) $f/4 < d_6 + d_7 < f/1.5$

(2) $0.1f < r_5 < 0.35f$

$0.1f < -r_6 < 0.35f$

(3) $\nu_2 > 40$

$\nu_5, \nu_6 > 55$

$\nu_4 < 40$

wherein the reference symbol $d_6+d_7$ represents thickness of the third lens component, the reference symbols $r_5$ and $r_6$ designate radii of curvature on the image side surface of the second lens component and on the object side surface of the third lens component respectively, the reference symbols $\nu_2$, $\nu_4$, $\nu_5$, $\nu_6$ denote Abbe's numbers of the second lens component, both the elements of the third lens component and the fourth lens component respectively and the reference symbol f represents total focal length of the lens system as a whole.

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**4,166,675**

## CLICK STOP DEVICE IN A CAMERA LENS BARREL

**Hideo Kanno, Kawasaki, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan**

**Filed Sep. 29, 1977, Ser. No. 837,729**

**Claims priority, application Japan, Oct. 5, 1976, 51-133357[U]**

**Int. Cl.[2] G02B 7/02**

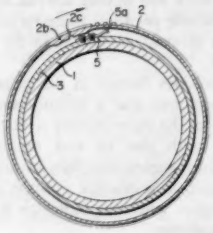
**U.S. Cl. 350—252** **3 Claims**

1. A click stop device in a camera lens barrel having a stationary barrel and a distance ring comprising:

an intermediate ring rotatably disposed on said stationary barrel with a predetermined clearance with respect to said distance ring;

means manually operable to fix said intermediate ring to said stationary barrel at any desired position; and

click stop means comprising two separate elements, one of which is provided on said distance ring and the other on




said intermediate ring so as to engage each other within said clearance.

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**4,166,676**

## METHOD OF TURNING OFF THE DISPLAY IN ELECTROCHROMIC DISPLAY DEVICES

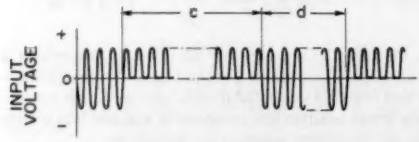
**Shigetaro Furuta, Fujisawa; Masachika Yaguchi, Yokohama; Shigeo Fujino, Odawara, and Haruhiro Kato, Kawasaki, all of Japan, assignors to Dai Nippon Toryo Co., Ltd., Osaka, Japan**

**Filed May 19, 1977, Ser. No. 798,489**

**Claims priority, application Japan, May 25, 1976, 51-60280**

**Int. Cl.[2] G02F *1/17***

**U.S. Cl. 350—357** **5 Claims**




1. In a method of controlling the display in a diffusion type electrochromic display device composed of a pair of oppositely disposed electrode plates at least one of which is transparent and an electrochromic composition sealed between said electrode plates, said electrochromic composition being composed of a solvent and an electrochromic compound coloring in a reduced state sealed between said electrode plates in a reducing atmosphere, the solubility of the electrochromic compound to the solvent being $10^{-2}$ mol/(100 g solvent) or more in a reduced state and $10^{-1}$ mol/(100 g solvent) or more in an oxidized state, the method of turning off the display in said display device comprising applying an alternating current input potential having a frequency of one to ten times as high as the cut-off frequency of said display device to said electrode plates of said display device, said alternating current input potential being applied to the electrode plates at least until the display is completely turned off.

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**4,166,677**

## ILLUMINATION SYSTEM FOR INDIRECT OPHTHALMOSCOPE

**Helmut A. Heine, Herrsching, and Helmut Rosenbusch, Weilheim, both of Fed. Rep. of Germany, assignors to Propper Manufacturing Co., Inc., Long Island City, N.Y. and Heine Optotechnik GmbH & Co. KG, Herrsching, Fed. Rep. of Germany**

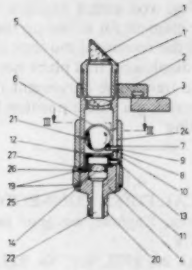
**Filed Aug. 15, 1977, Ser. No. 824,801**

**Claims priority, application Fed. Rep. of Germany, Aug. 17, 1976, 2636977**

**Int. Cl.[2] A61B *3/12***

**U.S. Cl. 351—16** **10 Claims**

1. An appliance for generating a light beam for indirect ophthalmoscopy comprising a housing, a beam outlet aperture in the housing through which the beam leaves the housing, first means within the housing for varying the colour of the beam leaving the housing and second means within the housing for varying the cross-section of the beam leaving the housing, said first and second means being independently adjustable, and a



single operating element associated with both said first means and said second means movable relative to the housing and accessable from outside the housing which independently and selectively adjusts said first means and second means so that said first means and said second means can be operated in conjunction with one another.

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**4,166,678**

## LIGHT SHIELD FOR PHOTOMETER-EQUIPPED CAMERA

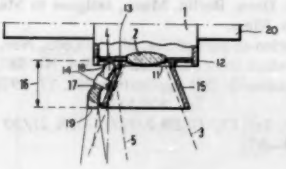
**Goetz Schrader, Frankfurt am Main, Fed. Rep. of Germany, assignor to Plaubel, Feinmechanik & Optik GmbH, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Sep. 7, 1977, Ser. No. 831,280**

**Claims priority, application Fed. Rep. of Germany, Sep. 8, 1976, 2640370**

**Int. Cl.[2] G03B *7/08, 11/04***

**U.S. Cl. 354—23 R** **5 Claims**



1. A light shield attachable to the front of a camera lens mount provided with a photocell window adjacent an objective, comprising:

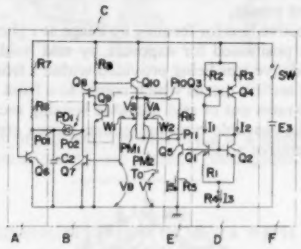
a generally frustoconical tube centered on the optical axis of said objective when operatively positioned on said lens mount, with its narrower end closely surrounding said objective and with its wider end extending into the path of axially incident light rays trained upon said window; and

light-guiding means externally of said tube with an entrance aperture laterally offset from said wider end and with an exit aperture closely confronting said window.

## 4,166,679
## EXPOSURE INFORMATION SETTING CIRCUIT

Motonobu Matsuda, Izumi; Masayoshi Sahara, Sennan, and Tokuji Ishida, Daito, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jun. 23, 1977, Ser. No. 809,472
Claims priority, application Japan, Jun. 24, 1976, 51-75039
Int. Cl.[2] G03B 7/00
U.S. Cl. 354—60 R 14 Claims




1. An exposure information setting circuit for use in a photographic camera for calculating a required APEX exposure index in response to input signals indicative of the other APEX exposure indices and for producing an output signal indicative of the required APEX exposure index, said exposure information setting circuit including an integrated circuit for providing a constant voltage for performing the calculation of the required APEX exposure index, said integrated circuit comprising;

(a) a first pair of transistors consisting of a first transistor and a second transistor, the bases of said first and second transistors being connected to each other;

(b) a second pair of transistors consisting of a third transistor and a fourth transistor, the bases of said third and fourth transistors being connected to each other;

(c) means for connecting the collector of said first transistor to the collector of said third transistor;

(d) means for connecting the collector of said second transistor to the collector of said fourth transistor;

(e) means for connecting the emitters of said first and second transistors through a first connecting point;

(f) means for connecting the emitters of said third and fourth transistors through a second connecting point;

(g) a resistor connected between said second connecting point and the emitter of one of said third and fourth transistors;

(h) means for providing said first pair of transistors with a base current in accordance with the voltage level at the connecting point between the collectors of said first and third transistors for providing negative feedback;

(i) means for providing said second pair of transistors with a base current in accordance with the voltage level at the connecting point between the collectors of said second and fourth transistors for providing negative feedback;

(j) means for supplying power between said first and second connecting points;

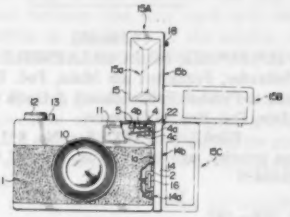
(k) an output transistor, the base-emitter voltage thereof being determined depending on the base-emitter voltage of one of the first, second, third and fourth transistors; and

(l) an output resistor connected to the collector of the output transistor, the collector current of the output transistor flowing through the output resistor and the desired constant source voltage being obtainable from the output resistor.

## 4,166,680
## STROBO UNIT FOR CAMERA

Yoshihisa Maitani, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Dec. 5, 1977, Ser. No. 857,248
Claims priority, application Japan, Jan. 27, 1977, 52-9172[U]
Int. Cl.[2] G03B 15/02, 15/03, 15/05
U.S. Cl. 354—126 6 Claims




6. A strobo unit for a camera having a mounting shoe and first internal camera switch means movable between an automatic exposure position and a flashlight position;

said strobo unit having a mounting plate and a flash unit swingably mounted on said mounting plate;

said plate having means for engaging said shoe to releasably secure said strobo unit to said camera;

said flash unit including a power switch operable from a closed position to an open position by engagement with said mounting plate;

said flash unit being adapted to swing between a first position engaging said mounting plate and said power switch and a second position engaging said first switch means for switching from said automatic exposure position to said flashlight position.

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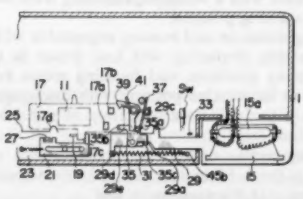
## 4,166,681
## CAMERA INCORPORATING AN ELECTRONIC FLASH DEVICE

Toshinori Imura, and Akira Yamanaka, both of Sakai, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed May 27, 1977, Ser. No. 801,195
Claims priority, application Japan, Jun. 11, 1976, 51-76726[U]
Int. Cl.[2] G03B 3/00, 9/02, 15/05
U.S. Cl. 354—149 15 Claims




1. In a camera including a body and an objective lens, having an adjustable diaphragm and means for focussing said objective lens and first adjusting means for adjusting said diaphragm in response to said focussing means and second adjusting means for adjusting said diaphragm independently of said focussing means and means for alternatively enabling one of said first and second means;

an electronic flash device including a light emitting member moveable between a retracted position within said camera body and an extended position projecting beyond said camera body, spring means biasing said light emitting member toward its extended position, first lock means for releasably locking said light emitting member in its retracted position, a control member for controlling said

second adjusting means and for disabling said second adjusting means and enabling said first adjusting means at a predetermined position of said control member, means responsive to said control member being at said predetermined position for releasing said first lock means so that said flash device moves to its extended position and means for locking said control member in said predetermined position in response to said light emitting member being in its extended position.

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**4,166,682**

## VIEWFINDER FOR COLLAPSIBLE CAMERA

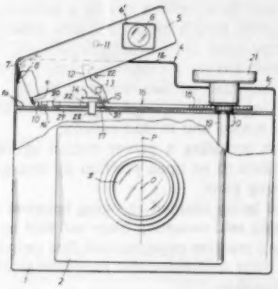
**Goetz Schrader, Frankfurt am Main, Fed. Rep. of Germany, assignor to Plaubel, Feinmechanik & Optik GmbH, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Sep. 7, 1977, Ser. No. 831,266**

**Claims priority, application Fed. Rep. of Germany, Sep. 8, 1976, 2640435**

**Int. Cl.[2] G03B *17/04***

**U.S. Cl. 354—187** **8 Claims**



1. In a camera having a housing and a lens mount with an objective centered on an optical axis, said lens mount being connected with said housing by an articulated linkage and being widely separated from said housing along said axis in a range of operating positions, the combination therewith of:

a casing fully receivable in a peripheral cutout of said housing in a withdrawn position and movable from said cutout into a working position, said casing being articulated to said housing for swinging about a pivotal axis substantially paralleling said optical axis, a portion of said casing being provided with a window projecting from said housing in said working position;

focusing means on said housing engageable with said linkage for axially displacing said lens mount in said range of operating positions, said focusing means being movable into an inoperative position with disengagement of said linkage to facilitate a retraction of said lens mount into said housing;

retaining means operatively coupled with said focusing means for holding said casing in its withdrawn position during said disengagement; and

a viewfinder in said casing in line with said window.

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**4,166,683**

## FOLDABLE PHOTOGRAPHIC APPARATUS

**Fumio Ito, and Mutsunobu Yazaki, both of Yokohama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Jul. 29, 1977, Ser. No. 820,321**

**Claims priority, application Japan, Jul. 30, 1976, 51-91092**

**Int. Cl.[2] G03B *13/06, 17/04***

**U.S. Cl. 354—192** **11 Claims**

1. A foldable photographic apparatus, comprising:

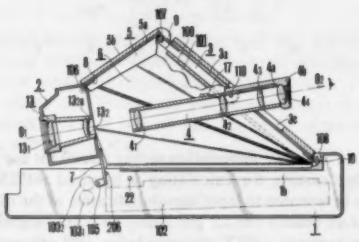
(a) holding means for supporting a photosensitive element in position for exposure;

(b) means for forming a dark room for protecting said photosensitive element supported by said holding means from being exposed by unnecessary light, said means including:

a plural number of housing section means being pivotally coupled to each other, wherein one of said housing section means is a basic housing section which works as a base, while other housing section means can be shifted from a folded position and to an operative position respectively against said basic housing section; and

flexible opaque bellow means for forming a dark room completely shielded from light by shielding a portion which cannot be shielded from light by said housing section means;

(c) an objective lens for forming an image at a photosensitive element positioned for exposure by said holding means, said objective lens being provided within a front movable housing section means which comes to a front position of the apparatus out of said movable housing section means when the movable housing section means are shifted to said operative position;



(d) a mirror for reflecting light transmitted by said lens toward said photosensitive element, wherein said mirror is provided on a rear movable housing section means which comes to a rear part of the apparatus out of the movable housing section means when the movable housing section means are shifted to operative positions respectively; and

(e) view finder optical lens means, having:

first finder optical lens means provided within the front movable housing section means, said first finder optical lens means having a plurality of lenses linearly arranged on the same optical axis, and being arranged so as to aim at an almost similar object as said objective lens; and

second finder optical lens means pivotally coupled with the rear movable housing section means, said second finder optical lens means having a plurality of lenses arranged linearly on the same optical axis, and being so designed that the optical axis coincides with the optical axis of said first finder optical lens means.

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**4,166,684**

## THREE DIMENSION CAMERA HAVING A FILM HOLDER

**Chi Y. Law, 7845 Cambie St., Vancouver, British Columbia, Canada (V6P 3J1)**

**Division of Ser. No. 765,228, Feb. 3, 1977, Pat. No. 4,125,849. This application Feb. 24, 1978, Ser. No. 880,888**

**Int. Cl.[2] G03B *17/26***

**U.S. Cl. 354—203** **2 Claims**

1. A removable film holder for a photographic camera for taking three dimensional photographs wherein a lenticular screen is moved relative to photosensitive material during exposure, the combination comprising:

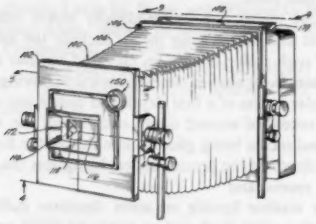
a housing;

a pressure plate mounted on said housing;

means for moving said pressure plate inwardly and outwardly of said housing in directions substantially normal to the plane of such pressure plate;

means for applying a uniform pressure to said pressure plate in such outward direction with respect to said housing;

a stop affixed to said housing;
said pressure plate having a side for engagement with said stop; and



means for urging said pressure plate in a direction substantially parallel with said pressure plate against said stop.

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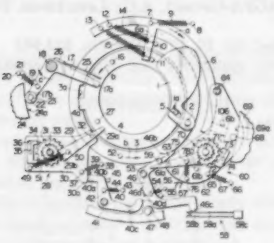
**4,166,685**

## BLADED SHUTTER FOR CAMERA WITH FOCAL PLANE SHUTTER

**Akihiko Hashimoto, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed Dec. 23, 1976, Ser. No. 753,624**
**Claims priority, application Japan, Feb. 16, 1976, 51/15593**
**Int. Cl.[2] G03B *9/00, 9/08***
**U.S. Cl. 354—231** **10 Claims**



1. A camera, comprising:
(A) a lens assembly for focusing external light on a focal plane of said camera;
(B) a focal plane shutter located adjacent said focal plane and including first and second shutter blinds and means for consecutively running said shutter blinds responsive to the initiation of a shutter release operation;
(C) operator actuable means for initiating said shutter release operation;
(D) a plurality of shutter blades housed in said lens assembly;
(E) operating means capable of moving said shutter blades between a fully open and fully closed position, said operating means being adapted to operate said shutter blades in a bladed shutter mode of operation responsive to the initiation of a shutter release operation; said bladed shutter mode of operation being that mode of operation wherein said shutter blades are:
(1) placed into said fully closed position before said first blind begins to run;
(2) placed into a preset intermediate open position after said first blind has completed its run but before said second blind begins to run, said preset intermediate open position corresponding to a desired aperture setting and lying between said fully open and said fully closed position; and
(3) placed into said fully closed position a preset time period after said shutter blades are placed in said preset intermediate open position but before said second blind begins to run; and
(F) externally adjustable aperture setting means cooperating with said operating means to determine the degree said shutter blades are open when they are in said preset intermediate position whereby said shutter blades cooperate with each other to function as both a bladed shutter and an aperture;
(G) said operating means comprising:
(1) concentric shutter opening and shutter closing rings, each of said shutter blades being pivotally connected to both of said rings in such a manner that said shutter blades move between said fully open and said fully closed position as a function of the relative angular orientation of said shutter opening and shutter closing rings;
(2) a shutter opening governor means for retarding the angular movement of said shutter opening ring with respect to said shutter closing ring during the period of time when said shutter blades are moved into said fully closed position;
(3) a shutter closing governor means for retarding the angular movement of said shutter closing ring with respect to said shutter closing ring during said preset period of time;
(4) means for urging both of said rings to rotate responsive to the initiation of said shutter release operation.

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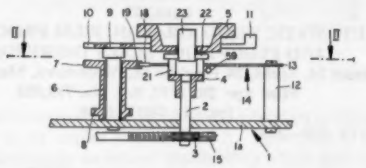
**4,166,686**

## SHUTTER-CONTROL MECHANISM FOR PHOTOGRAPHIC CAMERA

**Goetz Schrader, Frankfurt am Main, Fed. Rep. of Germany, assignor to Plaubel, Feinmechanik & Optik GmbH, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Sep. 7, 1977, Ser. No. 831,265**
**Claims priority, application Fed. Rep. of Germany, Sep. 8, 1976, 7628114[U]**
**Int. Cl.[2] G03B *17/38***
**U.S. Cl. 354—266** **7 Claims**

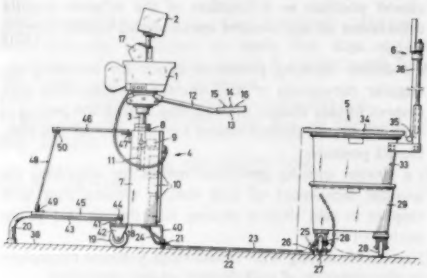


1. In a camera provided with a housing adapted to receive a photographic film to be exposed, lens means axially movable with reference to the film plane, a focusing knob on said housing operatively coupled with said lens means for axially moving same, a shutter in line with said lens means spring-biased into a normal position and displaceable into a cocked position, and an actuating mechanism on said housing for operating said shutter,
the improvement wherein said actuating mechanism comprises:
wind-up means including a rotatable disk alongside said knob operatively coupled with said shutter for displacing same into its cocked position;
a retaining member having a coupling formation engageable with a mating formation of said disk for holding said shutter in said cocked position; and
trigger means including a pushbutton coaxially received in said knob for deactivating said detent means to release said shutter, said pushbutton having an extension engageable with said retaining member for depressing same.

## 4,166,687
## STAND FOR A STUDIO CAMERA AND A PHOTOGRAPHIC STUDIO EQUIPPED THEREWITH

Rudolf Viering, Cologne, Fed. Rep. of Germany, assignor to Pixyfoto GmbH, Cologne, Fed. Rep. of Germany

Filed Oct. 17, 1977, Ser. No. 843,095
Claims priority, application Fed. Rep. of Germany, Oct. 16, 1976, 2646789
Int. Cl.² G03B *15/00, 17/00*
U.S. Cl. 354—290 14 Claims

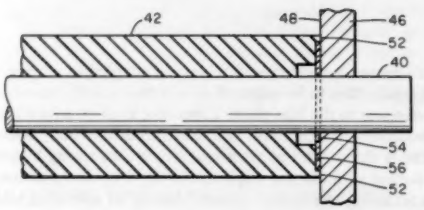


1. A stand for a studio camera, having a column which supports the camera and which can be raised and lowered, and a housing in which are accommodated the bearing arrangement and the raising and lowering device for the column as well as electrical switching-, control- and safety devices for the studio camera and for a flash appliance, characterised in that the stand (4) is adapted to be traversable by means of wheels (19) provided on the housing (7) and that it has a spacer (22) which is pivotable about a horizontal axis (21) into the base plane, to the free end of which an alignment rail (27) for a subject table (5) can be applied and which is provided with a longitudinally extending cable duct (23) leading from the subject table (5) to the stand (4).

## 4,166,688
## AUTOMATIC PHOTOGRAPHIC FILM PROCESSOR AND FLUID-TIGHT SEALS THEREFOR

Emanuel M. Sachs, 24 Franklin St., Watertown, Mass. 02172

Filed Apr. 28, 1977, Ser. No. 792,055
Int. Cl.² G03D *3/08*
U.S. Cl. 354—319 6 Claims




1. In an automatic photographic film processor of the type provided with a plurality of annularly arranged parallel rollers positioned in longitudinally contacting relation to form the periphery of a chamber adapted to contain a processing solution, a pair of parallel side plates, the rollers being transversely disposed between the side plates, and wherein each of the rollers is comprised of a body portion of a resilient material and a metal shaft extending longitudinally therethrough, the improvement comprising:

means for longitudinally strain relieving at least one end of one of such rollers in the region of the body of such roller end adjacent the boundary between the shaft and the roller body; and

means for providing a fluid-tight seal between the roller end and the side plate;

wherein said means for longitudinally strain relieving a roller end and said sealing means include the end of the body of such roller having an elevated annular shoulder and an annularly shaped recessed portion having:

a first annular recess of a first depth and radius and a second annular recess of second depth and radius, the radius of the second recess being greater than that of the first recess and the depth of the second recess being less than that of the first recess; and

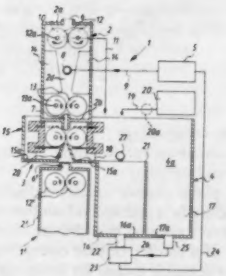
an annular washer having an inner diameter sufficient to receive the roller shaft and an outer diameter no greater than twice the radius of the second recess;

the washer having a thickness no greater than the height of the elevated annular shoulder of the roller end.

## 4,166,689
## APPARATUS FOR WET TREATMENT OF CARRIERS OF PHOTOSENSITIVE MATERIAL

Helmut Schausberger, Unterhaching; Konrad Brückl, and Günther Sailer, both of Munich, all of Fed. Rep. of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Fed. Rep. of Germany

Filed Jul. 19, 1977, Ser. No. 816,942
Claims priority, application Fed. Rep. of Germany, Jul. 23, 1976, 2633145
Int. Cl.² G03D *3/08*
U.S. Cl. 354—321 29 Claims

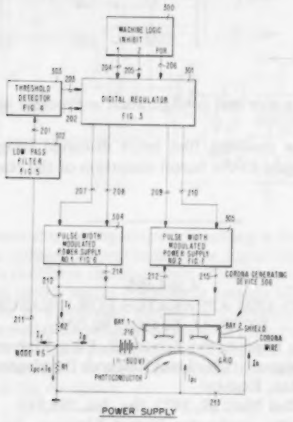


1. Apparatus for wet treatment of sheet- or web-like carriers of photosensitive material, comprising at least one treating unit including a liquid-containing vessel having an upper part and a lower part, one of said parts having an inlet opening for admission of carriers and the other of said parts having an outlet opening for evacuation of carriers; means for transporting carriers along a substantially vertical first path in a direction from said inlet opening toward said outlet opening; and a sealing device connected with said vessel, disposed below said lower part and including means for intercepting the liquid which issues from said vessel through the opening of said lower part, said device having an underside provided with a passage in line with said openings and sealed from the opening of said lower part, and means defining a second path along which carriers are free to move in said direction between said passage and the opening of said lower part, said path defining means comprising a pair of rotary squeegees having cylindrical carrier-engaging walls consisting at least in part of elastomeric material and disposed at the opposite sides of said second path.

## 4,166,690
## DIGITALLY REGULATED POWER SUPPLY FOR USE IN ELECTROSTATIC TRANSFER REPRODUCTION APPARATUS

James L. Bacon; Larry M. Ernst, and William G. Hauptman, all of Boulder, Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 2, 1977, Ser. No. 847,957
Int. Cl.[2] G03G *15/02;* H02M *3/335*
U.S. Cl. 355—3 CH 13 Claims


MACHINE LOGIC INHIBIT
THRESHOLD DETECTOR FIG. 6
DIGITAL REGULATOR FIG. 3
LOW PASS FILTER FIG. 5
PULSE WIDTH MODULATED POWER SUPPLY NO. 1 FIG. 4
PULSE WIDTH MODULATED POWER SUPPLY NO. 2 FIG. 7
CORONA GENERATING DEVICE 108
CORONA WIRE
PHOTOCONDUCTOR
POWER SUPPLY

1. In an electrophotographic machine of the type described, a method for rapidly supplying a predetermined voltage from a power supply to a charge corona unit, said method comprising the following steps:

(a) preconditioning a digital regulator of the power supply to the nominal operating point for the corona voltage supplied to the charge corona unit;

(b) digitally controlling the power supply with the preconditioned regulator upon initial electrical connection of the power supply to the corona unit; and

(c) digitally dynamically regulating the power supply in accordance with variations of the corona provided by the charge corona unit after the power supply is electrically connected to the corona unit.

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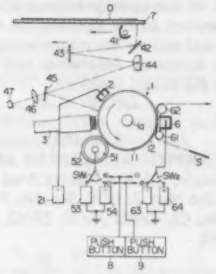
## 4,166,691
## RECORDING SYSTEM

Yutaka Ebi, Kawasaki; Tositaka Hirata, Tokyo; Toshifumi Kato, Tokyo, and Yohei Ikezu, Tokyo, all of Japan, assignors to Ricoh Company, Ltd., Japan

Filed Aug. 4, 1978, Ser. No. 931,130
Claims priority, application Japan, Aug. 10, 1977, 52-96272
Int. Cl.[2] G03G *15/00*
U.S. Cl. 355—11 23 Claims

23. A recording system comprising a latent image carrier, means for forming an electrostatic latent image on the carrier, developing means for selectively subjecting the latent image formed to a direct development or a reversal development process to produce a positive or a negative visual image, means for electrostatically transferring the positive or the negative visual image onto a record sheet, and means for switching the polarity of a transfer voltage to said transfer means so as to be opposite from the polarity to which a toner which forms the




visual image being transferred is charged in accordance with the polarity of the toner charge.

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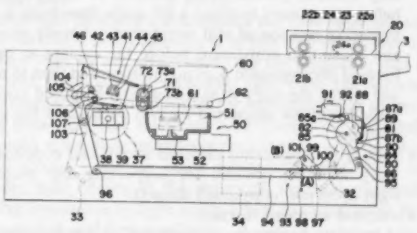
## 4,166,692
## PROTECTION AND SAFETY DEVICE FOR A PHOTOCOPYING MACHINE

Osamu Okada, Toyokawa, and Shunji Yamamoto, Shinshiro, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Sep. 8, 1977, Ser. No. 831,674
Claims priority, application Japan, Sep. 14, 1976, 51-111070; Sep. 16, 1976, 51-126041[U]
Int. Cl.[2] G03G *15/00;* G03B *27/76*
U.S. Cl. 355—14 10 Claims



1. In a photocopying machine wherein light from an original document to be copied and scanned by light from a light source is directed by an optical system along a light path leading to an electrophotosensitive medium which is exposed to the light to form an electrostatic latent image of the original document thereon, said medium being moved in a path disposed within a machine housing, and an image of the original document formed on said electrophotosensitive medium is transferred onto a copy paper, and said machine having a power source and a portion movable from a closed position against the machine housing to an open position, the improvement comprising:

switch means actuable to switch said power source on and off;

light blocking means provided adjacent said light path and movable to a first position wherein said blocking means blocks passage of light along said light path and to a second position wherein said blocking means is out of said light path;

lock means actuable to lock said portion of the machine in the closed position; and

control means for interlocking said switch means with said light blocking means and lock means for moving said blocking means to said second position when said switch means is moved to the position for turning said power source on and moving said blocking means to said first

position when said switch means is moved to the position for turning said power source off, and for actuating said lock means for locking said portion of the machine against movement to the open position only when said switch means is moved to the position for turning said power source on and said switch means being movable to switch the power source on only when said portion of the machine is in the closed position.

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**4,166,693**

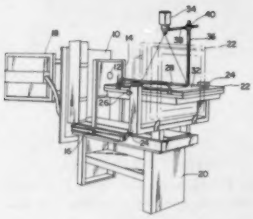
## PHOTOGRAPHIC APPARATUS AND METHOD

**Benjamin Santuccio, 729 Van Houten Ave., Clifton, N.J. 07013**

**Filed May 2, 1978, Ser. No. 902,072**

**Int. Cl.[2] G03B** *27/52, 27/62, 27/32*

**U.S. Cl. 355—61** **9 Claims**



1. A photocopy device including, in combination,

a camera and

a pivotally mounted copyboard for rotation from an adjustably focused photocopying position of said copyboard before the camera to about a 90° angle therefrom in copy mounting position of said copyboard, whereby to center and focus said copyboard before the camera in camera focused photographic copying position and then to mount and adjust the copy in said angularly disposed copy adjusting position supported by said copyboard for photocopying,

a light projecting means disposed above said copyboard in copy adjusting position for supporting and projecting light upon said copyboard through

a template mounted therein,

said template having linear markings on a transparent surface for projection of an image of said markings therethrough by said light as guide lines upon said copyboard for copy positioning thereon, according to said light projected linear markings,

whereby, the copy in said copyboard, pivotally raised to photographic position is in focus and position for photographic copying without further need for adjustment of the camera, copy material or copyboard.

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**4,166,694**

## METHOD FOR OPTICALLY DISTORTING READOUT RETICLES

**John E. Horning, Churchville; Roy R. Radzai, Roslyn, both of Pa., and John R. Hagstrom, Key Largo, Fla., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Mar. 28, 1978, Ser. No. 890,891**

**Int. Cl.[2] G03B** *27/32, 27/68*

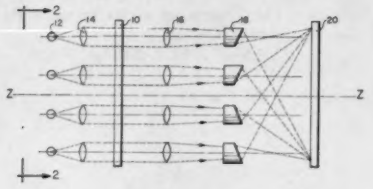
**U.S. Cl. 355—77** **4 Claims**

1. A method of preparing a film reticle having a plurality of legends thereon for a readout unit having a corresponding plurality of optical projectors and a flat screen therefor, comprising the steps of:

preparing an undistorted flat layout of a plurality of legends arranged according to the corresponding position of the optical projectors of the readout unit;

exposing the layout on a photosensitive film through a very short focal length lens having a flat side adjacent to the layout; and

developing the photograhic image on said film into a film



reticle of a size and configuration acceptable in the readout unit;

whereby the resulting film bears distorted images of the legends equal to the barrel distortion of the readout unit.

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**4,166,695**

## METHOD AND APPARATUS FOR MEASURING RETINAL BLOOD FLOW

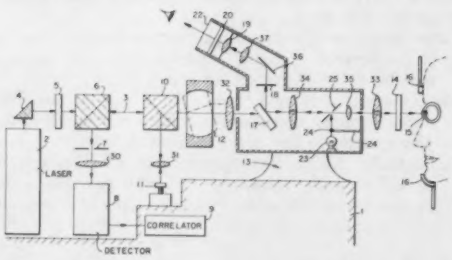
**David W. Hill, London, and Edward R. Pike, Malvern, both of England, assignors to National Research Development Corporation, London, England**

**Filed Mar. 29, 1977, Ser. No. 782,510**

**Claims priority, application United Kingdom, Apr. 1, 1976, 13132/76**

**Int. Cl.[2] G01B** *11/26*

**U.S. Cl. 356—28** **8 Claims**



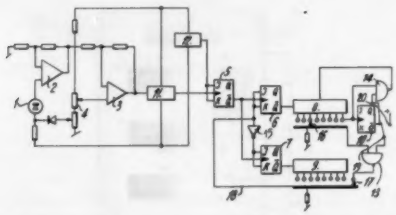

1. Apparatus for measuring retinal blood flow comprising a laser for producing a beam of radiation, means for directing a single beam of the laser radiation along an optical path into an eye and onto a retinal blood vessel, a detector for detecting laser radiation reflected from blood corpuscles within the blood vessel, and for producing a doppler output signal, means for directing laser radiation reflected by the eye into the detector, means for variably deflecting the laser radiation across the optical path to enable the desired part of the retinal blood vessels to be illuminated by the laser radiation and defining an acceptance angle, a light source for general illumination of the fundus of the eye, means for observing light and laser radiation reflected by the eye and for determining the angle of the blood vessel, the doppler angle of the blood vessel being determined from said acceptance angle and said angle of the blood vessel, whereby the laser radiation may be directed along the optical path and onto the retinal blood vessel and the laser radiation reflected from the blood vessel is reflected back along the optical path into the detector to determine the doppler shift of laser radiation and hence blood flow velocity from the value of the doppler output signal and from the doppler angle defined by said acceptance angle and said angle of blood vessel.

4,166,696

## PHOTOMETER

Charles L. Rochat, Veyrier, Switzerland, assignor to Pignons S.A., Ballaigues, Switzerland

Filed Apr. 29, 1977, Ser. No. 792,495
Claims priority, application Switzerland, May 4, 1976, 5542/76
Int. Cl.[2] G01J 1/42; G03B 7/00
U.S. Cl. 356—223 3 Claims



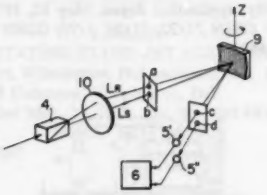
1. A photometer arrangement comprising a photodiode for supplying a voltage proportional to the logarithm of the light intensity, an oscillator the frequency of which is controlled by said voltage, timing means controlling passage of the pulses of the oscillator to a counting circuit for a predetermined fixed time, a differential amplifier connected to said oscillator and a manually controllable potentiometer connected to said differential amplifier and to said photodiode for controlling the frequency of the oscillator.

4,166,697

## SPECTROPHOTOMETER EMPLOYING MAGNETO-OPTIC EFFECT

Masaru Ito, Kodaira; Seiichi Murayama, Kokubunji; Manabu Yamamoto, Odawara, and Kounosuke Ohishi, Mito, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Sep. 27, 1977, Ser. No. 836,971
Claims priority, application Japan, Oct. 1, 1976, 51-117161
Int. Cl.[2] G01J 3/42
U.S. Cl. 356—319 6 Claims



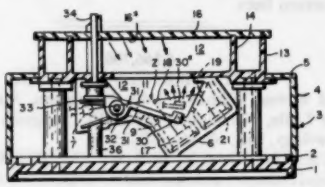
1. In a spectrophotometer employing a magneto-optic effect which includes;
a space for accommodating a sample to be measured;
means for applying a magnetic field to said space;
light irradiation means for irradiating said space with linearly polarized light;
polarization-separation means for allowing entry of the light from said light irradiation means after having passed through said space, and for separating and projecting this incident light in two light beams in proportion to the intensity of two mutually perpendicular polarization components;
spectral analyzer means equipped with means for converging the two light beams separated by said polarization-separation means and with a dispersive element for spectrally dispersing the two light beams thus converged; and
light detection means for detecting the two light beams dispersed by said dispersive element;
the improvement wherein said dispersive element is arranged in such a manner that the plane containing the two light beams incident on said dispersive element is substantially perpendicular to the plane defined by the dispersion direction of said dispersive element.

4,166,698

## SECONDARY LIGHT TESTING IN OPTICAL SMOKE DETECTORS

Donald F. Steele, Cohasset, Mass., assignor to American District Telegraph Company, Jersey City, N.J.

Filed Jun. 10, 1977, Ser. No. 805,512
Int. Cl.[2] G01N 21/00
U.S. Cl. 356—338 14 Claims



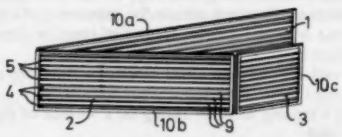
1. A unitary smoke alarm comprising:
a smoke accessible dark chamber at least partially enclosed by a light scattering wall,
a source of light projected on a path in the chamber,
a photocell disposed adjacent the chamber to view an area within the chamber and responsive to light scattered by particles in the path within the chamber to generate an alarm, and
actuated light directing means outside the view of the photocell having a first condition in which it is ineffective to direct light to the area viewed by the photocell, and a second condition for directing light onto the viewed chamber area in the enclosure for secondary light scattering from said light scattering wall toward the photocell thereby to simulate particles in the chamber, said means in said second condition being substantially ineffective to direct light density to the photocell, and said photocell being responsive to light scattered by particles when the means is in said first condition.

4,166,699

## DEVICE FOR OPTIC, PREFERABLY VISUAL DETERMINATION OF A CERTAIN PLANE

Lars A. Bergkvist, 890 42 Mellansel, Gottne, Sweden

Filed Oct. 11, 1977, Ser. No. 841,121
Claims priority, application Sweden, Oct. 15, 1976, 7611513
Int. Cl.[2] G01B 11/27
U.S. Cl. 356—375 15 Claims



1. A device for optically determining a certain plane comprising, at least two screen units, each screen unit including a first forward screen, a rearward screen and a second forward screen, said rearward screen arranged to form an angle with said first forward screen behind said first forward screen, said second forward screen arranged in front of said rearward screen parallel thereto and substantially to the side of said first forward screen, said screens including a plurality of screen lines arranged parallel relative to each other, the divisions of

the screen lines of the first and second forward screens being the same, the divisions of the screen lines of the rearward screen being different than those of the first and second forward screens, the screen lines of said forward screens and said rearward screen being such that when light is passed through said screens interference patterns are formed, the interference pattern formed by the first forward screen and the rearward screen being dark bands disposed generally parallel to the screen lines when the device is viewed in said certain plane, the interference pattern formed by the first forward screen and the rearward screen being dark bands disposed generally at an angle to the screen lines when the device is viewed from a position outside of said certain plane, the interference pattern formed by the second forward screen and the rearward screen being dark bands which always are disposed generally parallel to the screen lines.

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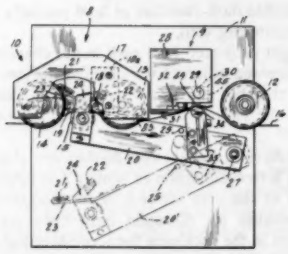
**4,166,700**

## FILM THICKNESS DETECTOR

**Howard Bowen, Wilmette; Dave Henderson, Mundelein, and Steve Little, Northbrook, all of Ill., assignors to Research Technology, Inc., Skokie, Ill.**

**Filed Jun. 24, 1977, Ser. No. 809,651**
**Int. Cl.[2] G01B *11/06***
**U.S. Cl. 356—381** **3 Claims**



1. A motion picture film thickness detector system for analyzing a motion picture film strip, comprising:

(a) first thickness detector means for monitoring thickness changes substantially along a central longitudinal axis of the motion picture film strip but not edges of the film strip, said first thickness detector means including

(i) cylindrical guide means for guiding the film strip along a curved path;

(ii) light source means positioned for projecting a light beam which is tangent to a portion of the film strip along said curved path, said light beam forming an angle with a longitudinal axis of said film strip at said portion of the film at which the light beam is tangent, said angle being less than 90°;

(b) second thickness detector means for measuring sprocket hole defects along one edge of the film strip and third thickness detector means for measuring thickness variations adjacent picture frames of the film strip along the other edge of the film strip;

(c) said second and third thickness detector means each comprising:

(i) a sensing member riding on a surface of the film strip; and

(ii) positioning means for positioning the film strip adjacent the sensing member; and

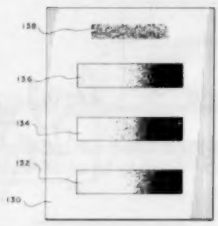
(d) first, second, and third film rollers, a pivoting arm, said cylindrical guide means being positioned on said arm so as to selectively swing between the first and second rollers and position the film strip into the light beam between the first and second rollers, and the positioning means being positioned on the same arm so as to selectively swing to a position adjacent each sensing member between the second and third film rollers.

**4,166,701**

## METHOD AND APPARATUS FOR ASCERTAINING COLOR BALANCE OF PHOTOGRAPHIC PRINTING PAPER

**Bertram W. Miller, Apartado Postal 316, Chapala, Jalisco, Mexico**

**Filed Jul. 5, 1977, Ser. No. 812,808**
**Int. Cl.[2] G01J *3/46*; G03B *27/04***
**U.S. Cl. 356—404** **8 Claims**



1. A method for ascertaining the color balance of color photographic printing paper of the type having superimposed light-sensitive emulsion layers, comprising the steps:

(a) forming separate test images on a sample sheet of printing paper using predetermined linearly varying log exposures of different colors of light, and

(b) measuring the relative responsiveness of the emulsion layers using differential displacements of like values of optical density on each of the test images.

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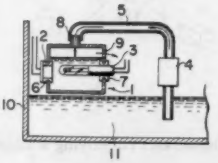
**4,166,702**

## DEVICE FOR DETECTING A TONER CONCENTRATION IN A DEVELOPING SOLUTION

**Toyoo Okamoto, Yokohama, and Seiichi Miyakawa, Nagareyama, both of Japan, assignors to Ricoh Company, Ltd., Japan**

**Continuation of Ser. No. 683,763, May 6, 1976, abandoned. This application Jan. 18, 1978, Ser. No. 870,520**
**Claims priority, application Japan, May 12, 1975, 50-56901**
**Int. Cl.[2] G01N *21/22, 21/26, 1/10*; G03D *13/00***
**U.S. Cl. 356—440** **16 Claims**



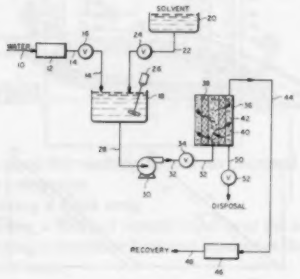
1. A device for detecting the concentration of toner in a developing solution of a copying apparatus having a reservoir for containing a supply of developing solution, comprising a casing having an inlet port and an overflow port, means adapted to connect said inlet port with said reservoir for pumping developing solution into said casing, a light-emitting means disposed in said casing, a light-sensing means spaced from and facing said light-emitting means in said casing, whereby light from said light-emitting means can pass through developing solution in said space and onto said light-sensing means so as to enable a detection of the toner concentration of said solution, said overflow port being disposed in said casing above the level of said light-emitting element, said light-sensing element and said space therebetween.

4,166,703

## TESTING OF FIBROUS COALESCER ELEMENTS

Milton Kirsch, Canoga Park, and Robert W. Melvold, Simi Valley, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Nov. 14, 1977, Ser. No. 851,029
Int. Cl.[2] G01N 21/06
U.S. Cl. 356—442 5 Claims




1. A method of testing fibrous elements for their ability to effectively coalesce and separate into separate components an emulsion of water and petroleum compounds selected from the group consisting of crude oil and distillate fractions thereof comprising the steps of:

introducing a reproducible emulsion consisting essentially of water and an organic solvent substantially free of surface active agents into contact with a fibrous element contained in a test zone, one of said water or organic solvent being present as a major component of said emulsion,

withdrawing separate streams of coalesced water and organic solvent from said zone,

passing one of said separate streams comprising the major component between a source of light and a light-measuring means,

measuring the intensity of light received by said light-measuring means while said stream is passing between said source of light and said light-measuring means, and

determining the acceptability of said fibrous element based on the intensity of the light so measured.

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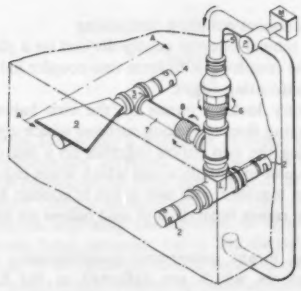
4,166,704

## ROTATING FLUID JET AGITATOR

Robert E. Albert, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 29, 1978, Ser. No. 891,407
Int. Cl.[2] B01F 5/20
U.S. Cl. 366—167 4 Claims



1. A rotating fluid jet agitator for mixing liquids in tanks which comprises an agitator portion having

at least one primary jet mixing nozzle arranged to rotate about a generally vertical axis at a predetermined elevation in said tank to project a stream of liquid radially outward from said vertical axis;

means for rotating said primary jet mixing nozzle about said vertical axis comprising a drive nozzle attached to said agitator portion and arranged to deliver a generally horizontal component of thrust to cause said agitator to rotate about said vertical axis;

means for circulating liquid under pressure to said primary jet mixing nozzle and said drive nozzle from said tank; and

control means for controlling the speed at which said primary nozzle rotates about said vertical axis.

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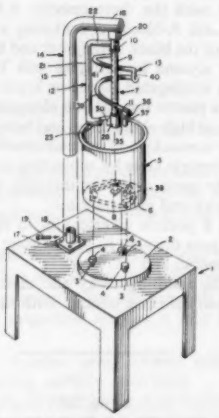
4,166,705

## APPARATUS FOR MIXING HANDCRAFT MATERIALS

Robert D. Fronske, Tempe, Ariz., assignor to Fronske Handcraft Equipment Corporation, Tempe, Ariz.

Filed Apr. 20, 1978, Ser. No. 898,182
Int. Cl.[2] B01F 9/00
U.S. Cl. 366—221 14 Claims



1. Apparatus for mixing handcraft materials, such as potter's clay, comprising:

(a) a container for the material to be mixed,

(b) means for rotating said container,

(c) a stationary scraper bar positioned within said container adjacent the inner surface thereof and extending generally in a direction substantially parallel with the axis of rotation of said container for scraping from said inner surface the material being mixed,

(d) means for supporting said scraper bar within said container, and

(e) an elongated mixing member mounted within said container and rotatable therewith,

(f) said mixing member extending

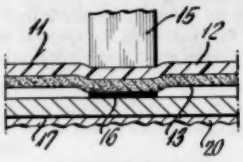
(1) from a point adjacent the bottom of said container is substantially the form of a helix in a first direction around the axis of rotation thereof for a predetermined distance toward the top of said container, and then

(2) in a reverse direction substantially in the form of a helix around said axis and toward the top of said container for the remainder of the length thereof.

## 4,166,706
## LIFT-OFF TAPE AND PROCESS

Ralf Korpman, Bridgewater, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.

Filed Aug. 1, 1977, Ser. No. 820,677
Int. Cl.[2] B41J *31/05*
U.S. Cl. 400—696 5 Claims




1. The process of applying an adhesive film to an application surface which comprises:

a. selecting a normally nontacky and normally nonelastomeric adhesive film consisting essentially of thermoplastic and elastomeric A-B block copolymers wherein the A-blocks are thermoplastic and possess a number average molecular weight of at least about 6,000 and the B-blocks are elastomeric and possess a number average molecular weight in the range of about 45,000–180,000, and 20–120 parts per one hundred parts by weight of the block copolymers of normally solid resins adapted to associate principally with the thermoplastic A-blocks of said copolymers; said A-blocks constituting about 5–50 percent by weight of the block copolymer and being derived from styrene or styrene homologues said B-blocks being derived from conjugated dienes or lower alkenes, said film exhibiting a plastic state at low elongations and an elastomeric state at high elongations and being convertible from a normally nontacky and nonelastomeric plastic state to a tacky elastomeric state by subjecting said film to substantial stress to cause it to pass through its plastic state and become tacky and elastomeric;

b. subjecting a portion of said film to substantial stress to cause it to pass through its plastic state and become tacky and elastomeric; and

c. pressing the resulting tacky and elastomeric portion of said film into adhering contact with said surface.

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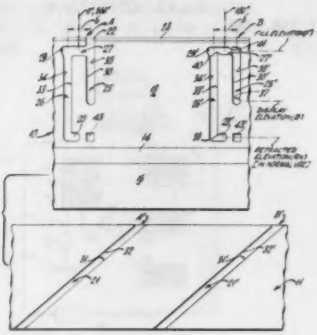
## 4,166,707
## SWIVEL LIPSTICK OR THE LIKE CONTAINER

John S. Zawacki, Jr., Meriden, and Eric A. Hultgren, Westport, both of Conn., assignors to Eyelet Specialty Co., Inc., Wallingford, Conn.

Filed Oct. 25, 1977, Ser. No. 845,038
Int. Cl.[2] A45D *40/04*
U.S. Cl. 401—68 9 Claims

1. A swivel container for lipstick or the like, comprising concentric inner and outer relatively rotatable tubular members which are open at the same end, a carrier including cam-follower means and slidably guided within said inner member, cam means on said tubular members and coacting with said cam-follower means for selective longitudinal displacement of said carrier means upon relative rotation of said tubular members, said inner-member cam meams comprising first and second longitudinally extending slots at angularly spaced locations, one of said slots being of length to accommodate a maximum range of ultimate carrier-propulsion use and the other of said slots being of lesser length, said inner-member cam means including means defining an offset-slot communication of said other slot with said one slot near the upper end of said one slot; whereby, when said cam-follower means is in said other slot, the bottom end of said other slot may establish the retracted elevation of said carrier member at a level above the retracted elevation established when said cam-follower means is in said one slot; the retracted elevation in said one slot being sufficiently low to fully retract an unused lipstick or the like carrier by said carrier means, and the retracted elevation in said other



slot being such as to externally expose the outer end of such unused lipstick or the like for visual display of the color and texture of the lipstick or the like without requiring container actuation.

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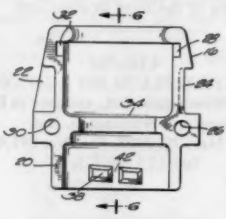
## 4,166,708
## COUPLING FOR QUICK CONNECTION OF ELEMENTS

Gary S. Lafferty, Sr., Franklin, Wis., assignor to Milwaukee Electric Tool Corporation, Brookfield, Wis.

Continuation-in-part of Ser. No. 619,944, Oct. 6, 1975, abandoned. This application Nov. 8, 1976, Ser. No. 740,048
Int. Cl.[2] F16B *7/18*
U.S. Cl. 403—342 2 Claims



1. A quick-connect coupling comprising

a generally tubular coupler axially divided on a plane intersecting the coupler axis to form two coupler halves meeting on confronting edges,

complimentary locking means on the two halves having interengaging sloping locking surfaces which are engaged by bringing the two halves together on a line of motion perpendicular to said plane and which when engaged hold the halves together with said edges in contact and which positively resists separation of said halves on said line of motion,

said locking means comprising complimentary cam and ramp surfaces which are deflected as the halves are brought together and have reverse contours which engage when the confronting edges are in engagement,

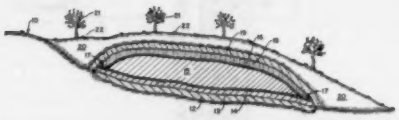
each of said halves including in addition to said locking means a pin and a tab on one of said edges and a hole and a slot on the opposite edge.

4,166,709

## METHOD FOR VAULTING HAZARDOUS CHEMICAL WASTE MATERIALS

Richard E. Valiga, Centre Square, Pa., assignor to Stabatrol Corporation, Norristown, Pa.

Filed Aug. 3, 1978, Ser. No. 930,705
Int. Cl.[2] E02D 3/12
U.S. Cl. 405—128 3 Claims



1. A method for vaulting hazardous chemical waste materials which comprises:

(1) selecting a vault area;

(2) applying a first soil cement layer over the said vault area;

(3) applying a second soil cement layer over the said first soil cement layer;

(4) applying a first water-impermeable film to the top of the said second soil cement layer;

(5) depositing the said hazardous chemical waste materials on the said first water-impermeable film;

(6) applying a second water-impermeable film over the compacted hazardous chemical waste materials;

(7) sealing the edges of the said first and second films;

(8) applying a third soil cement layer over the said second film;

(9) sealing the perimeter of said third layer to the perimeter of said second layer;

(10) covering the said third soil cement layer with filler materials and grading the said filler materials to conform to the terrain surrounding the said vault area.

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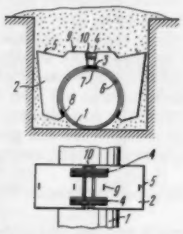
4,166,710

## DEVICE FOR SECURING A PIPELINE IN PLACE

Viktor V. Spiridonov, 7-ya Parkovaya ulitsa, 23a, kv. 64, Moscow, U.S.S.R.

Filed Jun. 26, 1978, Ser. No. 919,280
Int. Cl.[2] F16L 1/00, 55/00
U.S. Cl. 405—172 7 Claims



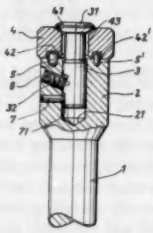
1. A device for securing a pipeline in place, comprising: a pair of symmetrically arranged ballast weights adjoining the pipeline and encompassing more than a half of its circumferential perimeter; contact shoes attached to the surfaces of said ballast weights, adjoining the pipeline, at least two of said contact shoes being arranged below the longitudinal axis of said pipeline; an articulared joint and securing means, with the aid of which said ballast weights are interconnected above said pipeline; said securing means, and said articulated joint arranged one above the other and, having a resilient distance piece; and said ballast weights carrying on their surfaces mounting slings arranged symmetrically with respect to the vertical plane of symmetry.

4,166,711

## CHUCKING REAMER WITH REPLACEABLE CUTTER

Dieter Kress, Aalen, and Friedrich Häberle, Lauchheim, both of Fed. Rep. of Germany, assignors to Mapal Fabrik für Prazisionswerkzeuge Dr. Kress KG, Aalen, Fed. Rep. of Germany

Filed Jan. 24, 1978, Ser. No. 871,925
Claims priority, application Fed. Rep. of Germany, Jan. 22, 1977, 2702620
Int. Cl.[2] B23B 51/00
U.S. Cl. 408—233 7 Claims



1. A chucking reamer comprising:

(a) a shank having an axis and a planar end face transverse to said axis,

(1) said shank being formed with an axial bore extending inward of said end face and another bore obliquely inclined to said axis and communicating with said axial bore;

(b) a cutter member having an annular rear face in contact with said end face and an annular front face,

(1) said cutter member being formed with a bore extending between respective orifices in said front face and rear face,

(2) said cutter member being formed with at least one axially extending, radially open flute;

(3) the orifice of said bore in said front face being bounded by an annular face portion of said cutter member flaring in a direction outward of said bore;

(c) a straight, elongated clamping stud,

(1) a first longitudinal portion of said stud being conformingly received in the bore of said shank,

(2) a second longitudinal portion of said stud being received in the bore of said cutter member with radial clearance;

(d) an enlarged head fixedly attached to said second portion and having an annular face portion tapering inward of said bore in said cutter member,

(1) one of said annular face portions being convexly arcuate in axial section and engaging the other annular face portion along a closed loop about said axis;

(e) a setscrew threadedly received in said other bore of said shank,

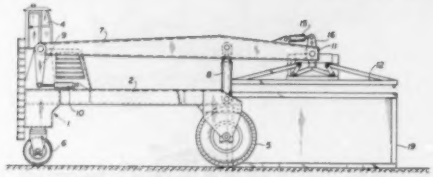
(1) said first portion of said shank having a face sloping obliquely toward said axis and toward said second portion,

(2) said setscrew abuttingly engaging said sloping face and thereby holding said annular face of said head in abutting engagement with said cutter member in the orifice in said face.

## 4,166,712
## LIFT TRUCK WITH TILTABLE AND ROTATABLE LIFTING YOKE

**Lars-Gunnar Öberg, Va Frölunda, Sweden, assignor to AB Bygg-och Transportekonomi (BT), Bromma, Sweden**

**Filed Oct. 4, 1977, Ser. No. 839,375**
**Claims priority, application Sweden, Oct. 20, 1976, 7611623**
**Int. Cl.[2] B66C *23/00***
**U.S. Cl. 414—732** **9 Claims**



1. A lift truck for handling containers comprising:

a carriage (1) having a generally U-shaped frame, said frame including two laterally spaced longitudinal frame girders (2) and means (3) extending transversely of said frame girders (2) and interconnecting said frame girders (2) only at one end portion thereof, said frame girders (2) being free of transversely extending means between said one end portion thereof and the other end thereof;

two laterally spaced lifting arms (7), each of which is pivotally mounted relative to a respective longitudinal frame girder (2) in the vicinity of the ends of said respective frame girders (2) which are interconnected by said transverse interconnecting means (3) for vertical pivotal movement of said lifting arms (7) relative to their respective frame girder (2);

a cross girder (11) tiltably mounted to said lifting arms (7) in the vicinity of the ends of said lifting arms (7) which are remote from said transverse interconnecting means (3);

a lifting yoke (12) rotatably mounted to said cross girder (11) between said two lifting arms (7), said lifting yoke (12) being further tiltable forward and backward relative to said lifting arms (7) in the longitudinal direction of said lifting arms (7) and independently of the position of said lifting arms (7), said lifting yoke (12) being rotatable relative to said lifting arms (7) through an angle of at least 90°;

means coupled between said cross girder (11) and at least one of said lifting arms (7) for tilting said cross girder (11), and for consequently tilting said lifting yoke (12), relative to said lifting arms (7); and

turning means (14) coupled to said lifting yoke (12) for causing said lifting yoke (12) to rotate relative to said lifting arms (7).

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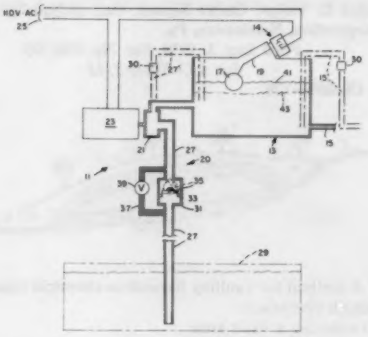
## 4,166,713
## AUXILIARY LIQUID TANK

**James L. Debrey, P.O. Box 1584, Springfield, Ill. 62705**

**Continuation of Ser. No. 652,222, Jan. 26, 1976, abandoned. This application Jul. 18, 1977, Ser. No. 817,005**
**Int. Cl.[2] F04B *49/04***
**U.S. Cl. 417—40** **10 Claims**

1. In a system for improving the reliability of an auxiliary tank for supplying liquid for useful functions, such as fueling an engine-generator, said system comprising a tank input supply-conduit system including a power-operated pump and a liquid-level-controlled switch for cycling said pump to maintain the liquid level in said tank between full and nearly full levels, the improvement comprising: a check-valve means in said input supply-conduit system, said check-valve means being constructed and arranged to provide slow back-flow through said supply-conduit system to cause periodic, exemplarily exercising of said auxiliary-tank system to maintain said system in lubricated and primed conditions.



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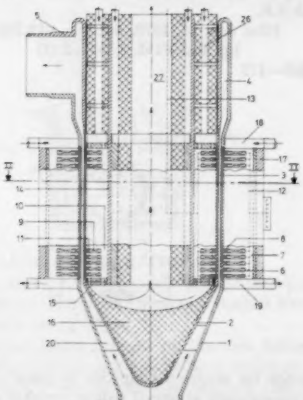
## 4,166,714
## ELECTROMAGNETIC PUMP

**Rainer Rienass; Enno Buscher, and Walter Jansing, all of Bergisch Gladbach, Fed. Rep. of Germany, assignors to Interatom, International Atomreaktorbau G.m.b.H., Bergisch Gladbach, Fed. Rep. of Germany**

**Filed Aug. 22, 1977, Ser. No. 826,632**
**Claims priority, application Fed. Rep. of Germany, Aug. 20, 1976, 2637473**
**Int. Cl.[2] H02N *4/20***
**U.S. Cl. 417—50** **2 Claims**



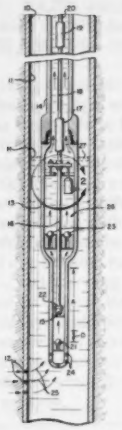
1. In an electromagnetic pump for electrically conductive liquid, two coaxial tubes radially spaced from and stationary with respect to one another and defining an annular channel therebetween traversible by the conductive liquid, a first set of induction coils disposed outside said outer coaxial tube and a second set of induction coils disposed within said inner coaxial tube, and a support tube disposed within and coaxially to said inner coaxial tube, said second set of induction coils being releasably fastened to said support tube.

4,166,715

## OIL WELL PUMPING TUBE DRAIN DEVICE

Leonard L. Huckaby, P.O. Box 152, Wayne, Okla. 73095

Filed Mar. 13, 1978, Ser. No. 885,802
Int. Cl.[2] F04B *21/00, 39/00*
U.S. Cl. 417—434 2 Claims



1. A drain device for insertion in an oil well pumping tube supported at the end portion of a pipe string, to equalize the hydrostatic pressure of oil pumped up through said tube and pipe string, and the oil in the annulus defined between the exterior of the pumping tube and pipe string and interior wall of the casing, and wherein a polish rod on the end of sucker rods in the pipe string for reciprocating a pump plunger in the lower portion of said pumping tube extends into said pumping tube, said device including, in combination:

(a) a check valve housing secured to the interior of said pumping tube adjacent to a portion of said polish rod, said housing having a vertical open passage at its upper end extending downwardly into the housing to terminate in an increased diameter portion defining a valve seat, a valve ball and spring biasing the ball upwardly against said valve seat to hold the check valve normally closed, the upper end of said passage in said housing above said valve seat being in communication with the oil passing up through said tube and pipe string;

(b) a fitting in the lower wall of said housing below said valve seat and extending through a side wall portion of said pumping tube, said fitting defining an outlet orifice placing the interior of said housing below said valve seat in communication with the exterior of said pumping tube and thereby in communication with said annulus;

(c) a valve rod having one end received in the upper open end of said passage in a position to engage the top surface of said ball;

(d) engageable means secured to the opposite end of said valve rod; and

(e) means on said polish rod defining a downwardly facing annular shoulder positioned to engage said engageable means to move said valve rod downwardly and unseat said ball only when said polish rod is intentionally lowered beyond its normally lowest reciprocating point by lowering the sucker rods in said pipe string,

whereby oil in said pipe string can flow through said check valve to said annulus to equalize said hydrostatic pressure, said engageable means including a sleeve segment having upper and lower ends surrounding a portion of said polish rod adjacent to said valve rod such that said polish rod can reciprocate through said sleeve, said sleeve having an exterior laterally extending structure, said valve rod being secured to a portion of said laterally extending structure of said sleeve; a fixed structure secured to the inside of said pumping tube a given distance below said lower end of said sleeve and having a central opening through which said polish rod passes; a guide rod having one end secured to said fixed structure to one side of said central opening and extending vertically upwardly, said exterior laterally extending structure of said sleeve including a portion circumferentially spaced from said first mentioned portion defining a vertical bore positioned to receive the upwardly extending end of said guide rod therethrough; and stop means secured to the extending end of said guide rod above said bore to function as a first stop to limit upward movement of said sleeve a given distance such that the lower end of said valve rod is still received in said passage of said check valve housing when said stop means is engaged by said laterally extending structure of said sleeve, said lower end of said sleeve engaging said fixed structure upon downward movement, said given distance being sufficient to permit unseating of said ball by said valve rod, said means on said polish rod for engaging said engageable means comprising a coupling for connecting said polish rod to the lowermost sucker rod, said coupling engaging said upper end of said sleeve when said sucker rods are lowered beyond said lowest reciprocating point.

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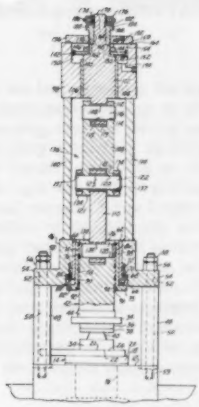
4,166,716

## MECHANICAL TOGGLE AND FLUID ACTUATED RAM FOR POWDER COMPACTING PRESS

Raymond P. DeSantis, Royal Oak, Mich., assignor to PTX-Pentronix, Inc., Lincoln Park, Mich.

Filed May 20, 1977, Ser. No. 798,823
Int. Cl.[2] B30B *11/02, 15/06*
U.S. Cl. 425—78 2 Claims



1. In a press comprising a table, a ram reciprocably movable relative to said table, first means for reciprocating said ram comprising a first connecting rod having an end pivotably attached to an end of said ram, a second connecting rod having an end pivotably attached to the other end of said first connecting rod and another end pivotably attached to a slide member and an arm pivotably attached at one end to said pivotable connection between said first and second connecting rods for displacing said pivotable connection to a position laterally moving said pivotable connection for displacing said ram away from said table to a position displacing said ram towards said table, and second means for reciprocating said slide member in timed relationship with the operation of said first means for additionally reciprocating said ram relative to said table, the improvement for said second means comprising a cylinder, a piston reciprocable in said cylinder and connected to said slide member, means introducing a pressurized fluid selectively to one side and the other of said piston for reciprocating said piston, and abutment means adjustably defining the extreme positions of motion of said slide member, said abutment means comprising a plug threadably mounted in an end closure plate

of said cylinder and having an end disposed toward said piston engageable with a shoulder formed in said slide for limiting reciprocation of said slide in one direction, an end portion of said slide projecting through a bore in said plug and being provided with a thread, and a collar adjustably threadable on said threaded end portion forming abutment means engageable with abutment means provided on the other end of said plug for limiting reciprocation of said slide in an opposite direction.

4,166,717

## PROCESS FOR DYEING CELLULOSIC TEXTILES WITH INDIGO

Andrew Fono, Montclair, N.J., and Ray F. Patton, Burlington, N.C., assignors to Royce Chemical Company, East Rutherford, N.J.

Continuation of Ser. No. 706,203, Jul. 19, 1976, abandoned. This application Mar. 3, 1978, Ser. No. 883,271

Int. Cl.[2] C09B *7/00, 7/02, 9/04;* D06P *1/22*

U.S. Cl. 8—38 8 Claims

1. A process for dyeing cellulosic textile with indigo dye which comprises: reducing indigo with sodium dithionite in the presence of sodium hydroxide to form a dye solution with all of the dye in its soluble lueco form; aging the dye solution for about 12 hours adding additional sodium dithionite and sodium hydroxide to the aged dye solution; incorporating an aldehyde bisulfite or an aldehyde sulfoxylate addition product to stabilize the aged dye solution with additional sodium dithionite and sodium hydroxide therein; immersing a cellulosic textile in the stabilized dye solution maintained in the range of about 25° C. to 35° C.; and exposing the immersed cellulosic textile to air or oxygen to oxidize the indigo dye back to its insoluble color; said aldehyde addition product to indigo dye having a molar ratio greater than about 0.7; said sodium dithionite to aldehyde addition product having a molar ratio greater than about 1.1; said sodium hydroxide not exceeding about 3% by weight of the dye solution.

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4,166,718

## PROCESS FOR BLEACHING TEXTILES

Gerhard Reinert, Allschwil; Gerd Holzle, Liestal, and Andre Pugin, Riehen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Mar. 20, 1978, Ser. No. 888,593

Claims priority, application Switzerland, Mar. 25, 1977, 3810/77

Int. Cl.[2] D06L *3/02*

U.S. Cl. 8—111 22 Claims

1. A process for bleaching textiles with photoactive compounds, which comprises treating stained textiles in an aqueous bath containing at least one photoactivator selected from the class of the water-soluble aluminum phthalocyanines, under irradiation with visible and/or infra-red light and in the presence of oxygen, while either irradiating the bleaching bath direct or subsequently irradiating the moist textiles outside the bath.

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4,166,719

## TESTING OF AQUEOUS SOLUTIONS

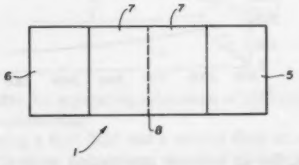
Stanley Renton, Penkridge, England, assignor to Albright & Wilson Limited, Oldbury, Warley, England

Filed Sep. 7, 1976, Ser. No. 721,066

Claims priority, application United Kingdom, Dec. 18, 1975, 51801/75

Int. Cl.[2] G01N *31/22*

U.S. Cl. 23—230 R 8 Claims




1. A method of determining the presence in an aqueous electroplating electrolyte containing suspended solids of (i) excess trace metals which react with ferrocyanide or of (ii) excess ferrocyanide comprising

contacting a portion of said electrolyte with a first portion of a water permeable cellulosic medium, said medium containing at least three portions,

a first portion which is adapted to be contacted by said electrolyte and which is free of ferrocyanide and iron salts,

a second test portion which is impregnated with a water soluble ferrocyanide salt and is free from iron salt and is in contact with said first test portion, and

a third test portion which is impregnated with a water soluble iron salt and is free from ferrocyanide salt and is also in contact with said first portion,

whereby a first part of said electrolyte diffuses through said first portion which separates out suspended solids and then contacts said second portion and a second part of said electrolyte diffuses through said first portion and then contacts said third portion, to indicate whether said electrolyte contains an excess of (i) said trace metals or of (ii) ferrocyanide.

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4,166,720

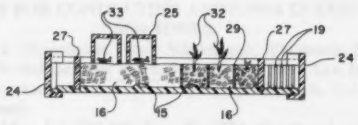
## LEACHING COLUMN AND METHOD OF USE

Jerome B. Weber, 6300 Lewisand Ct., Raleigh, N.C. 27609

Filed May 20, 1977, Ser. No. 798,824

Int. Cl.[2] G01N *31/06, 33/24*

U.S. Cl. 23—230 R 14 Claims




1. A device for use in determining the leaching characteristics of various substances comprising: an elongated, longitudinally separable leaching chamber having openings at each end thereof and containing a leaching medium whereby known substances can be placed in one end of said chamber and allowed to leach through said medium and exit the opposite end thereof prior to said chamber being longitudinally opened for substance analyzation of the basically undisturbed leaching medium; dispersing means disposed within said chamber for directing said substances away from the interior walls thereof and into said leaching medium whereby even distribution of said substance in said medium is obtained and flow of such substance along said interior walls is prevented; and medium dividers for use in each section when the same is separated to physically isolate the leaching medium into compartments.

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4,166,721

## DETERMINING THE LOCUS OF A PROCESSING ZONE IN AN OIL SHALE RETORT BY OFF GAS COMPOSITION

Chang Y. Cha, Bakersfield, Calif., assignor to Occidental Oil Shale, Inc., Grand Junction, Colo.

Filed Oct. 19, 1977, Ser. No. 843,442

Int. Cl.[2] G01N *31/12, 33/22, 33/28*

U.S. Cl. 23—230 EP 25 Claims

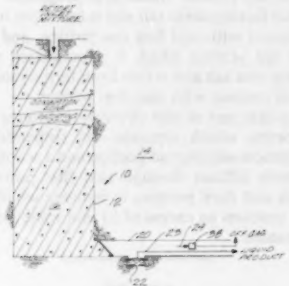
1. A method for determining the locus of a processing zone advancing through a fragmented permeable mass of particles containing oil shale in an in situ oil shale retort in a subterranean formation containing oil shale, the retort having boundaries of unfragmented formation and the retort having an effluent gas passing therefrom containing a selected constituent, the selected constituent being formed from at least one precursor contained in the formation by advancement of the processing zone through the fragmented mass, the method comprising the steps of:

determining content of such a precursor in formation at a plurality of locations in the retort before processing such locations;

predicting concentration of the selected constituent in efflu-

ent gas from the retort due to processing fragmented mass at at least a portion of such locations;

monitoring effluent gas from the retort for the concentration of the selected constituent; and



correlating the concentration of the selected constituent with such predicted concentrations for determining the locus of the processing zone in the retort.

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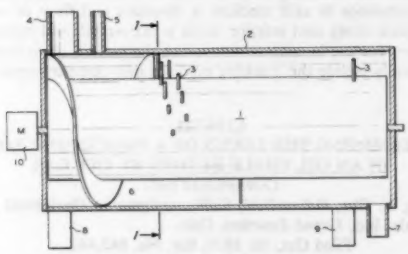
**4,166,722**

## PINNED SHAFT AND CARBON BLACK PELLETER

**Bernhard H. Geissler, and Paul D. Hann, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Nov. 8, 1977, Ser. No. 849,683**
**Int. Cl.[2] B01J 2/10; C01B 31/14**
**U.S. Cl. 23—314** **10 Claims**



**1.** In a pinned shaft useful for mixing devices having a plurality of pins extending essentially radially outwardly from an essentially cylindrical shaft, the improvement of arranging the pins with respect to an imaginary cylinder having the shaft axis as its cylinder axis and having a radius so that the imaginary cylinder intersects the pins with the centerpoints of the intersections of the pins and the imaginary cylinder

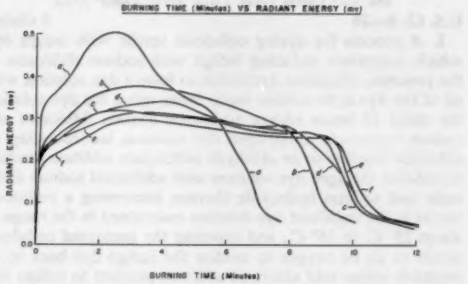
being arranged on a pattern of identically repeating units selected from the group of equilateral triangle, square and equilateral hexagon with the further provision that none of the sides or diagonals of the equilateral triangular patterns or the square patterns or the hexagonal patterns of pin placement are parallel to the axis of the imaginary cylinder.

**4,166,723**

## GELLED HYDROCARBON FUELS

**Edward F. Steigelmann, Park Forest, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.**

**Filed Jul. 30, 1965, Ser. No. 475,969**
**Int. Cl.[2] C10L 7/00**
**U.S. Cl. 44—7 A** **9 Claims**




**1.** A gelled fuel comprising:

(a) a major amount of a normally liquid petroleum fraction boiling in the range of about 100°–600° F.;

(b) from about 0.5 to about 20 weight percent of a gelling agent; and

(c) from about 0.5 to about 20 volume percent of acetic anhydride.

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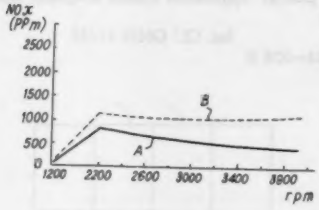
**4,166,724**

## FUEL COMPOSITION

**Mitsuhiro Kanao, 2156-14 Yakeyamacho, Kure-shi, Hiroshima-ken, Japan**

**Continuation of Ser. No. 564,183, Apr. 1, 1975, abandoned, which is a continuation of Ser. No. 447,190, Mar. 1, 1974, abandoned, which is a continuation of Ser. No. 292,837, Sep. 27, 1972, abandoned. This application May 23, 1977, Ser. No. 799,613**
**Claims priority, application Japan, Oct. 8, 1971, 46–79226**
**Int. Cl.[2] C10L 1/22**
**U.S. Cl. 44—56** **1 Claim**




**1.** A fuel, for an internal combustion engine, adapted to avoid the presence of nitrogen oxide, hydrocarbons, and carbon monoxide in the exhaust gas, comprising a fuel selected from the group consisting of gasoline and light oil having therein an additive mixed in the proportion of 10 liters of the fuel to about 3 to about 5 milliliters of the additive, said additive comprising a mixture of about 15 to about 16% of liquefied ammonia and about 85% to about 84% of methyl alcohol.

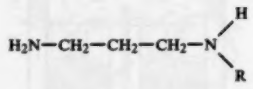
4,166,725

## OIL-SOLUBLE BIOCIDE COMBINATION FOR DISTILLATE FUELS

James W. Amick, Highland, Ind., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed Oct. 15, 1974, Ser. No. 514,496
Int. Cl.[2] C10L *1/22*
U.S. Cl. 44—72 1 Claim

1. A fuel composition having biocidal properties comprising a major proportion of hydrocarbon fuel boiling in the range from about 70° F. to about 750° F., about 0.0005 to about 0.05 weight percent of a mixture of 2,2'-oxybis(4,4,6-trimethyl-1,3,2-dioxaborinane) and 2,2'-(1-methyl-trimethylene dioxy)-bis-(4-methyl-1,3,2-dioxaborinane), and about 0.0005 to about 0.05 weight percent of a compound having the formula



where R is an alkyl group having an average chain length of 11 carbon atoms.

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4,166,726

## DIESEL FUEL CONTAINING POLYALKYLENE AMINE AND MANNICH BASE

Oliver L. Harle, San Anselmo, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Dec. 16, 1977, Ser. No. 861,482
Int. Cl.[2] C10L *1/22*
U.S. Cl. 44—73 15 Claims

1. A fuel composition for compression ignition engines which comprises a major amount of a hydrocarbon boiling within the range 120°–445° C. and containing from 5 to 300 parts per million of a polyalkylene amine and from 5 to 300 parts per million of the reaction product of: (a) an alkylphenol; (b) an aldehyde; and (c) an amine.

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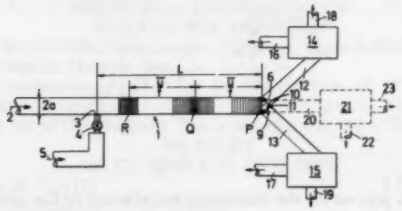
4,166,727

## PROCESS FOR SEPARATING SUBSTANCES OF DIFFERENT MASSES

Manuel Pinto de Novais Paiva, 3, Italielaan, Overijse, Belgium

Filed Mar. 8, 1977, Ser. No. 775,601
Claims priority, application Luxembourg, Mar. 23, 1976, 74622; Mar. 23, 1976, 76254
Int. Cl.[2] B01D *57/00*
U.S. Cl. 55—17 17 Claims



1. A process for separating substances of different masses by dispersion, comprising:

(a) admitting a first fluid and a second fluid at one end of a separating duct to form one stream containing a mixture of the admitted fluids, the second fluid being comprised of a mixture of n substances of different masses, n being equal to at least 2, and being periodically admitted to the separating duct,

(b) flowing the admitted fluids in laminar flow through the separating duct,

(c) axially dispersing the substances of the second admitted fluid in the stream to form at least two fluid fractions of the mixture of admitted fluids, with one of the fractions having a higher concentration of the first admitted fluid than the other fraction, wherein in each of the two fractions the average relative concentration of at least one of the n substances is higher than in the admitted second fluid, the average relative concentration of the substance having the heaviest mass being the highest in the fraction which has the highest concentration of the first admitted fluid, and,

(d) collecting at least two fluids at the other end of said separating duct, the collected fluids being said fractions of the mixture of admitted fluids.

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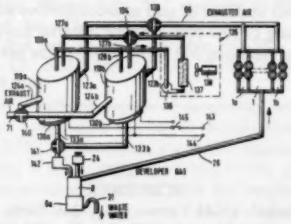
4,166,728

## PROCESS FOR CONDUCTING AMMONIA IN COPYING MACHINES

Karl-Heinz Degenhardt, Bad Schwalbach; Hermann Frank, Sulzbach, and Gerhard Marx, Taunusstein, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Division of Ser. No. 743,325, Nov. 19, 1976, abandoned, which is a continuation-in-part of Ser. No. 491,349, Jul. 24, 1974, abandoned. This application Jul. 28, 1977, Ser. No. 819,909
Claims priority, application Fed. Rep. of Germany, Jul. 26, 1973, 2337961; Oct. 29, 1976, 2649294; Oct. 30, 1976, 2649975
Int. Cl.[2] B01D *59/02*
U.S. Cl. 55—51 1 Claim

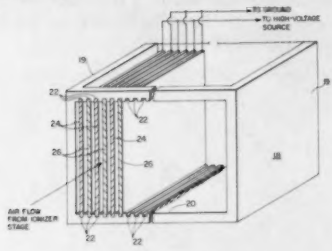


1. A process for conducting ammonia in a diazo copying machine which comprises passing ammonia-containing exhaust air by first conduit means from a developing station of said copying machine through a cooled heat exchanger in which the ammonia and water is frozen out, then heating said heat exchanger to a temperature at which the water and the ammonia are liquified, passing the mixture of liquified water and liquified ammonia to a releasing station, adding fresh ammonia water to the liquified water and to the liquified ammonia, passing it together with the liquified water and liquified ammonia in the releasing station counter-currently to vapor produced by a vapor-generating means, and conducting the gaseous ammonia to the developing station, said process employing two heat exchangers, the first heat exchanger through which the exhaust air is passed being cooled and the second heat exchanger being heated for liquifying the ammonia and water frozen out during the preceding process step, whereby the second heat exchanger is cooled and the first heat exchanger is heated.

## 4,166,729
## COLLECTOR PLATES FOR ELECTROSTATIC PRECIPITATORS

Joseph K. Thompson, Washington, D.C.; Robert C. Clark, Annandale; George H. Fielding, Alexandria, both of Va., and Harold F. Bogardus, Copenhagen, N.Y., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jul. 26, 1977, Ser. No. 819,205
Int. Cl.[2] B03C 3/08, 3/12, 3/60
U.S. Cl. 55—138 4 Claims




1. In an improved second stage of a two-stage electrostatic precipitator the improvement comprising:

an enclosed housing formed of an electrically non-conductive material including an axially aligned inlet and outlet;

a plurality of equally spaced, axially aligned grooves on the inner surface of said housing in oppositely disposed walls extending from said inlet to said outlet;

a plurality of collector plates assembled within said housing with opposite ends secured within said oppositely disposed grooves thereby aligning said plates in spaced parallel relationship between said inlet and said outlet.

each of said plates being formed from a non-conductive material, and a coating of low conductivity material on the outer surfaces of said non-conductive material,

said coating of low conductivity material having a conductivity of between 300 and 150,000 ohms per square.

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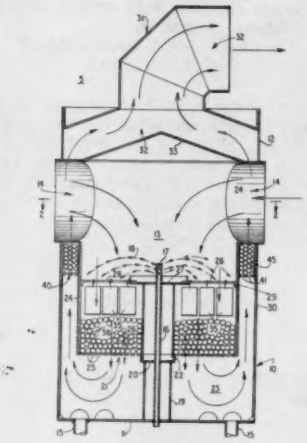
## 4,166,730
## SCRUBBER

John G. Warhol, 14041 Vernon Ave., Oak Park, Mich. 48237

Filed May 25, 1978, Ser. No. 909,489
Int. Cl.[2] B01D 47/00
U.S. Cl. 55—223 4 Claims

1. A scrubber comprising a cylindrical housing, a supply conduit extending axially of said housing for conveying scrubbant from an associated source upwardly along a vertical supply path to the upper end of said housing, means within said housing cooperating with said supply conduit for separating the interior of said housing into an upper chamber and an annular lower chamber surrounding said supply conduit and an annular scrubbing region surrounding said supply conduit between said upper and lower chambers, means for supplying material to be scrubbed to said upper chamber, the scrubbant and the material to be scrubbed flowing downwardly along an annular scrubbing path from said upper chamber through said scrubbing region to said lower chamber, contact means including light hollow plastic spherical balls disposed in said scrubbing region and providing spherical contact surfaces for maximizing the contact between the scrubbant and the material to be scrubbed while minimizing resistance to the flow of the scrubbant and the material to be scrubbed therethrough, and means defining an annular exhaust path coaxially surrounding the scrubbing path and providing communication between said lower chamber and an outlet port at the upper end of said



housing for exhausting scrubbed material from said lower chamber.

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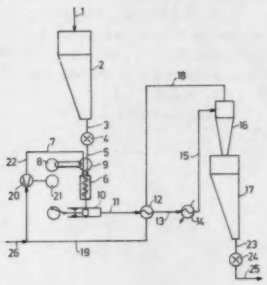
## 4,166,731
## PROCESS FOR THE CONTINUOUS INTRODUCTION OF FINE-GRAINED AND DUST-LIKE SOLIDS INTO A PRESSURIZED REACTION SPACE

Hermann Staege, Essen, Fed. Rep. of Germany, assignor to Krupp-Koppers GmbH, Essen, Fed. Rep. of Germany

Filed Oct. 6, 1977, Ser. No. 840,164
Claims priority, application Fed. Rep. of Germany, Oct. 23, 1976, 2648048
Int. Cl.[2] F17C 7/02
U.S. Cl. 62—46 7 Claims



1. A process for the continuous introduction of fine-grained and dust-like solids into a pressurized reaction space, the said process comprising

(a) mixing carbon dioxide in the form of dry ice with the solids after precooling the solids to a temperature of −80° C.;

(b) then bringing the formed mixture of solids and dry ice up to the pressure required for the introduction into the reaction space;

(c) then subjecting the dry ice to sublimation to separate it from the solids;

(d) subjecting the resulting gaseous $CO_2$ pressure release and cooling to the desublimation temperature so as to reconvert it to dry ice; and

(e) recirculating the formed dry ice into the next run while passing the solids into the reaction space.

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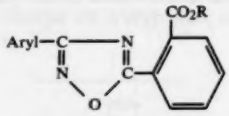
4,166,732

## OXADIAZOL-5-YL-BENZOATES

Robert K. Howe, Bridgeton, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed May 12, 1977, Ser. No. 796,255
Int. Cl.[2] A01N *9/22, 5/00*
U.S. Cl. 71—92 1 Claim

1. A method of regulating the growth of desirable plants which comprises applying to said plants an effective amount of a compound having the formula



wherein R is selected from the group consisting of hydrogen, lower alkyl and agriculturally acceptable cations; aryl is phenyl substituted by one trifluoromethyl.

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4,166,733

## CACODYLIC ACID-MONOSODIUM ACID METHANEARSONATE HERBICIDE COMBINATION

Donald N. Joy, Yakima, Wash., assignor to Crystal Chemical Company, Houston, Tex.

Continuation of Ser. No. 645,450, Dec. 30, 1975, abandoned, which is a continuation of Ser. No. 829,711, Jun. 2, 1969, abandoned. This application Sep. 25, 1978, Ser. No. 945,783
Int. Cl.[2] A01N *9/24*
U.S. Cl. 71—97 1 Claim

1. A method of controlling the growth of pigweed and ivyleaf morning glory which comprises applying to an area containing said plants an aqueous solution of a first herbicide selected from the group consisting of cacodylic acid and its salts, a second herbicide selected from the group consisting of methane arsonic acid and its salts, and a surfactant, the first herbicide being applied at a rate of 1 to 2 pounds of cacodylic acid equivalent per acre, the second herbicide being applied at a rate of 2 to 4 pounds of methane arsonic acid equivalent per acre, and the solution containing no more than about 0.25% by volume of surfactant.

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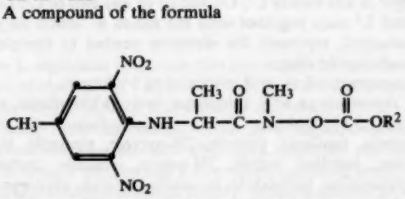
4,166,734

## HERBICIDAL DERIVATIVES OF N-ALKYLPROPANAMIDES

Ian D. Entwistle, Sittingbourne, England, assignor to Shell Coil Company, Houston, Tex.

Continuation-in-part of Ser. No. 855,104, Nov. 25, 1977, abandoned, which is a continuation-in-part of Ser. No. 826,214, Aug. 19, 1977, abandoned. This application Jun. 19, 1978, Ser. No. 910,404
Int. Cl.[2] A01N *9/20*; C07C *69/96*
U.S. Cl. 71—111 7 Claims

1. A compound of the formula



in which $R^2$ is an alkyl group containing from 1 to 2 carbon atoms optionally substituted by a chlorine atom.

6. A method for controlling undesirable plant growth at a locus which comprises applying to the locus to be protected a herbicidally effective amount of a compound according to claim 1 or a composition thereof.

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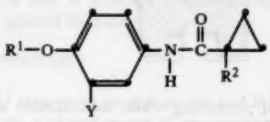
4,166,735

## CYCLOALKANECARBOXANILIDE DERIVATIVE HERBICIDES

Kurt H. G. Pilgram, and Richard D. Skiles, both of Modesto, Calif., assignors to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 761,515, Jan. 21, 1977, abandoned. This application Feb. 10, 1978, Ser. No. 876,595
Int. Cl.[2] C07C *103/19*; A01N *9/12, 9/14, 9/20*
U.S. Cl. 71—118 8 Claims

1. A compound of formula I



(I)

wherein

Y is $CF_3$;

$R^1$ is methyl, ethyl, isopropyl or cyclopropylmethyl; and

$R^2$ is a methyl group.

6. A method for controlling undesirable plant growth at a locus to be protected which comprises applying to the locus to be protected a herbicidally effective amount of a compound according to claim 1 or a composition thereof.

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4,166,736

## POWDERED METAL FILTER COMPOSITION AND PROCESSES FOR PRODUCING THE SAME

James G. Bewley, Tinton Falls, N.J., assignor to Metallurgical International, Inc., Tinton Falls, N.J.

Filed Jun. 14, 1978, Ser. No. 915,383
Int. Cl.[2] B22D *23/08*; C22C *38/02, 38/22*
U.S. Cl. 75—0.5 BA 19 Claims

1. A powdered metal composition consisting essentially of (a) a ferrous based alloy having by weight from approximately 0.60% to approximately 4.0% silicon; from approximately 0.08% to approximately 0.18% carbon; and from approximately 2.0% to 3.0% by weight molybdenum and exhibiting an apparent density of approximately 1.6 to 2.3 gm./cm.$^3$.

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4,166,737

## METHOD FOR DISSOLVING THE NON-FERROUS METALS CONTAINED IN OXYGENATED COMPOUNDS

Jean-Michel Demarthé, Viroflay, and Andre Georgeaux, Rambouillet, both of France, assignors to Minemet Recherche, Trappes, France

Filed Dec. 7, 1977, Ser. No. 858,196
Claims priority, application France, Dec. 9, 1976, 76 37053
Int. Cl.[2] C22B *13/04, 19/00, 15/08, 23/04*
U.S. Cl. 75—104 11 Claims

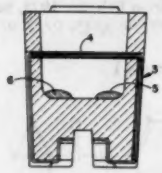
1. A method for the dissolution of nonferrous metals selected from the group consisting of copper, lead, zinc, and nickel contained in oxygenated compounds comprising subjecting said oxygenated compounds to the action of a ferrous chloride solution and causing a gas containing oxygen to bubble through the mixture, the process being conducted at atmospheric pressure, a temperature of from 60° C. to the boiling point of the mixture, and a pH of from 2 to 4.

4,166,738

## METHOD FOR THE TREATMENT OF NODULAR OR VERMICULAR CAST IRON SAMPLES

Jacques J. Plessers, Houthalen, Belgium, assignor to Electro-Nite Co., Philadelphia, Pa.

Filed Sep. 7, 1977, Ser. No. 831,213
Claims priority, application France, Sep. 9, 1976, 76 27172; Feb. 9, 1977, 77 03557
Int. Cl.² C22C *33/08*
U.S. Cl. 75—130 R 8 Claims



1. A method of promoting white solidification of an iron sample for analysis comprising:

(a) obtaining a molten sample treated so as to solidify as cast iron selected from the group consisting of nodular and vermicular cast iron, said sample containing atoms selected from the group consisting of magnesium and cerium atoms which inhibit white solidification of said sample,

(b) adding a material which will substantially bind said atoms in said sample, and

(c) adding tellurium to said sample to effectively stabilize iron carbides formed during the cooling of said sample.

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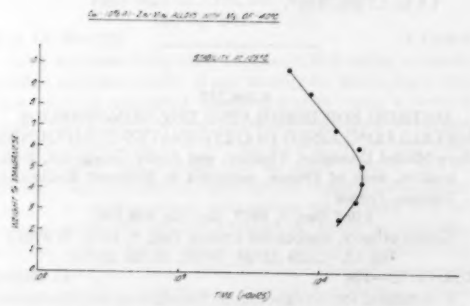
4,166,739

## QUARTERNARY β-BRASS TYPE ALLOYS CAPABLE OF BEING RENDERED HEAT RECOVERABLE

Peter L. Brooks, Palo Alto, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Continuation of Ser. No. 668,040, Mar. 18, 1976, abandoned. This application May 17, 1977, Ser. No. 797,621
Int. Cl.² C22C *9/04*
U.S. Cl. 75—157.5 16 Claims



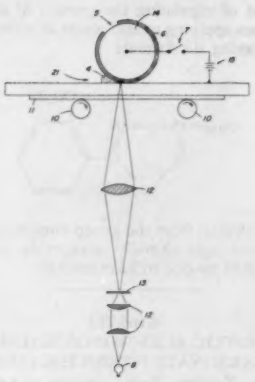
1. An alloy having a β-brass type structure capable of being rendered heat recoverable and capable of being cooled from a temperature at which it exists in an austenitic state to a temperature at which it exists in a martensitic state comprising 70–82% by weight copper, 6–12% by weight aluminum, 0.1–12% by weight manganese and 0.1–24% by weight zinc.

4,166,740

## ELECTROPHOTOSENSITIVE MATERIALS FOR MIGRATION IMAGING PROCESSES

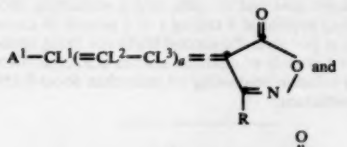
Frank G. Webster, Rochester, and Michael T. Regan, Fairport, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 818,689, Jul. 25, 1977, abandoned. This application Jul. 3, 1978, Ser. No. 921,388
Int. Cl.² G03G *13/22, 13/24*
U.S. Cl. 96—1 PE 3 Claims



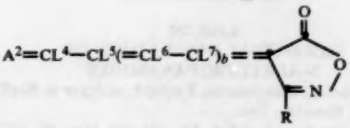
1. An electrophoretic migration imaging process which comprises subjecting an electrically photosensitive colorant material positioned between at least two electrodes to an applied electric field and exposing said materials to an image pattern of radiation to which the material is photosensitive, thereby obtaining image formation on at least one of said electrodes, wherein at least a portion of said electrically photosensitive colorant material is an electrically photosensitive material having a structure selected from the group consisting of:

I.



and

II.



wherein:

a and b represent zero, one or two;

$L^1$ through $L^7$, which may be the same or different, represent hydrogen, alkyl, aralkyl, aryl or dialkylaminoarylvinyl; or any two of $L^1$, $L^2$, and $L^3$ or any two of $L^4$, $L^5$, $L^6$ and $L^7$ may, together with the atoms to which they are attached, represent the elements needed to complete a carbocyclic ring;

R represents alkyl, aryl, nitroaryl or hydrogen;

$A^1$ represents an aryl, thiophene, benzo[b]thiophene, naphtho[2,3-b]thiophene, furan, isobenzofuran, chromene, pyran, xanthene, pyrrole, 2H-pyrrole, pyrazole, indolizine, indoline, indole, 3H-indole, indazole, carbazole, pyrimidine, isothiazole, isoxazole, furazan, chroman, isochroman, 1,2,3,4-tetrahydroquinoline, 4H-pyrrolo [3,2,1-ij]quinoline, 1,2-dihydro-4H-pyrrolo[3,2,1-ij]quinoline; 1,2,5,6-tetrahydro-4H-pyrrolo[3,2,1-ij]quinoline, 1H,5H-benzo[ij]quinolizine; 2,3-dihydro-1H,5H-benzo[ij]quinolizine; 2,3,6,7-tet-

rahydro-1H,5H-benzo[ij]-quinolizine; 10,11-dihydro-9H-benzo[a]xanthen-8-yl; 6,7-dihydro-5H-benzo[b]pyran-7-yl or a heterocyclic nucleus of the type described for $A^2$;

$A^2$ represents a N-alkyl or N-haloalkyl substituted nucleus selected from the group consisting of imidazole, 3H-indole, thiazole, benzothiazole, naphthothiazole, thianaphtheno-[7',6',4,5]-thiazole, oxazole, naphthoxazole, selenazole, benzoselenazole, naphthoselenazole, thiazoline, 2-quinoline, 4-quinoline, 1-isoquinoline, benzimidazole, 2pyridine, 4-pyridine, acridine, benzoxazole, imidazoquinoxaline, imidazoquinoline, and thiazoloquinoline;

and $A^1$ and $A^2$ may be further substituted with one or more moieties selected from the group consisting of a heterocyclic secondary amino, alkoxy, amino, arylamino, dialkylamino, diarylamino, alkyl, aryl, nitro, haloaryl, halogen and hydroxy.

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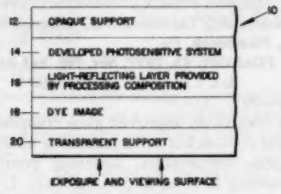
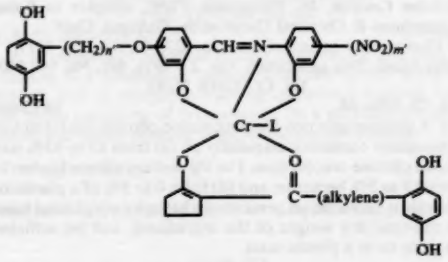
## 4,166,741
## YELLOW AZOMETHINE DYE DEVELOPERS

**Elbert M. Idelson, Newton Lower Falls, Mass., assignor to Polaroid Corporation, Cambridge, Mass.**

**Filed Sep. 23, 1977, Ser. No. 836,078**
**Int. Cl.[2] G03C *5/54, 1/40, 1/10***
**U.S. Cl. 96—77** **17 Claims**




5. A diffusion transfer film unit which comprises: a photosensitive element including a support carrying a photosensitive system comprising a silver halide emulsion layer associated with a 1:1 chrome complex dye developer which is represented by the formula:




where L represents molecules that can satisfy the coordination sphere of chromium, —alkylene— has from 0–6 carbon atoms, n' is an integer of from 1 to 8 and m' is 1 or 2;

an image receiving element which can be superposed on said photosensitive element after photoexposure and which includes a support and a dye image receiving layer; and

means retaining a diffusion transfer aqueous alkaline processing composition integrated with said elements so that said processing composition can be distributed between the superposed elements after photoexposure of the photosensitive element.

## 4,166,742
## CONTRASTY LIGHT-SENSITIVE SILVER HALIDE MATERIAL CONTAINING A HYDRAZINE DERIVATIVE AND A HETEROCYCLIC MERCAPTAN

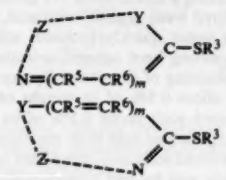
**Hiroyuki Mifune; Shunji Takada; Yoshitaka Akimura, and Tadao Shishido, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan**

**Filed Oct. 13, 1977, Ser. No. 841,855**
**Claims priority, application Japan, Oct. 18, 1976, 51-124621**
**Int. Cl.[2] G03C *1/28***
**U.S. Cl. 96—107** **11 Claims**

1. A silver halide photographic light-sensitive material containing at least one negative image silver halide photographic emulsion layer comprising silver halide grains which have an average grain size of not more than about 0.7$\mu$ and which are substantially of the surface latent image type and containing a binder in an amount of not more than about 250 g per mol of silver halide and in which a compound represented by the following general formula (I):

$$R^1NHNHCOR^2 \quad (I)$$

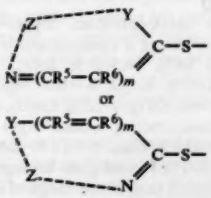
wherein $R^1$ represents an aryl group; and $R^2$ represents a hydrogen atom, a phenyl group or an unsubstituted alkyl group having 1 to 3 carbon atoms; is present in at least one of the hydrophilic colloid layers, said compound of the formula (I) being present in an amount of about $10^{-4}$ to about $10^{-1}$ mol/mol Ag based on the silver halide grains of the surface latent image type, and a compound represented by the following general formula (II) or (III):




(II)

(III)

wherein Y represents a sulfur atom, a selenium atom, an oxygen atom, a nitrogen atom or a divalent residue: —$NR^4$—, wherein $R^4$ represents a hydrogen atom, an alkyl group or an aryl group; Z represents an atomic group required for completing a 5- or 6-membered heterocyclic ring; $R^5$ and $R^6$, which may be the same or different, each represents a hydrogen atom, a halogen atom, a carboxy group, an alkoxycarbonyl group, an alkyl group, an aryl group, a hydroxy group, a mercapto group or an alkylthio group or $R^5$ and $R^6$ may combine and represent an atomic group required for forming a 5- or 6-membered ring; m is 0 or 1, with m being 0 where Y represents a sulfur atom, a selenium atom or an oxygen atom; and $R^3$ represents a hydrogen atom, an alkylthiocarbonyl group, an alkoxycarbonyl group, an aryloxycarbonyl group, an alkoxycarbonylmethyl group, an aryloxycarbonylmethyl group or a moiety represented by the formula:




wherein Y, Z, $R^5$, $R^6$ and m are as described above; is present in the same or a different hydrophilic colloid layer.

4,166,743

## INTUMESCENT FLAME-RETARDANT COATING COMPOSITIONS

**Joachim Wortmann, Türnich; Franz-Josef Dany, and Joachim Kandler, both of Erftstadt, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Hurth-Knapsack, Fed. Rep. of Germany**

**Filed Jan. 31, 1978, Ser. No. 873,974**

**Claims priority, application Fed. Rep. of Germany, Feb. 5, 1977, 2704897**

**Int. Cl.² C09K *3/28***

**U.S. Cl. 252—8.1** **7 Claims**

1. In an intumescent flame-retardant coating composition comprising a film-forming agent, an ammonium polyphosphate, at least one substance carbonizable under the action of heat, and a liquid dispersant; the improvement consisting of an activator for the ammonium polyphosphate consisting essentially of at least one salt which contains water of crystallization that is liberated when the composition is heated to about 35° C. in an amount of 0.5 to 50% by weight of the ammonium polyphosphate.

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4,166,744

## ADHESIVE CEMENTS ESPECIALLY ADAPTED TO SURGICAL USE

**David F. Smith, 2840 N. Ocean Blvd., Ste. 709, Ft. Lauderdale, Fla. 33308**

**Continuation-in-part of Ser. No. 593,885, Jul. 7, 1975, Pat. No. 4,046,578. This application May 31, 1977, Ser. No. 801,609**

**Int. Cl.² C09K *3/00***

**U.S. Cl. 106—35** **23 Claims**

1. The method of making a mix of ultra dry powdered ZnO and an ultra dry powdered weak organic solid acid, which mix when moistened with water quickly becomes adhesive and then quickly sets to a strong hard cement; selecting the said ZnO from the class consisting of (a) essentially pure ZnO and (b) ZnO treated with about 0.5% of its weight of propionic acid and (c) ZnO treated with about 0.5% of its weight of lauric acid; and selecting the said acid from the class consisting of (A) at least one powdered solid unpolymerized polycarboxylic acid that is quickly wet by and considerably soluble in water; (B) at least one solid powdered polymer acid that is quickly wet by and considerably soluble in water; mixing said selected ZnO and said selected acid in an inert volatile anhydrous liquid in amount at least sufficient to thoroughly wet the powder surface to form a slurry; evaporating the said liquid from said slurry after forming the slurry into a desired form while the slurry still retains at least a portion of the liquid; and protecting the said slurry and dried product from moisture until use.

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4,166,745

## REFRACTIVE INDEX-CORRECTED COPPER-CADMIUM HALIDE PHOTOCHROMIC GLASSES

**Roger J. Araujo, and Paul A. Tick, both of Corning, N.Y., assignors to Corning Glass Works, Corning, N.Y.**

**Filed Dec. 16, 1977, Ser. No. 861,129**

**Int. Cl.² C03C *3/08, 3/26***

**U.S. Cl. 106—47 Q** **4 Claims**

1. A refractive index-corrected copper-cadmium halide photochromic glass having a composition, in weight percent, of about 45–56% $SiO_2$, 14.5–21% $B_2O_3$, 9.0–15% $Al_2O_3$, 1.4–2.4% $Li_2O$, 2–12% $Na_2O$, 0–6.0% MgO, 0–3.5% BaO, 0–2.5% $TiO_2$, 0–1.4% $ZrO_2$, 0–1.5% $La_2O_3$, at least 8% total of refractive index-correcting oxides $MgO+BaO+TiO_2+ZrO_2+La_2O_3$, 0.1–0.5% CuO, 0.3–1.5% CdO, 0.3–0.9% Cl, 0–0.6% SnO, and 0–2% F, said glass having:

(a) a refractive index ($n_D$) in the range of about 1.52–1.54;

(b) chemical durability characterized by freedom from visible surface attack following a 10-minute exposure to 10% (wt.) HCl at 25° C.;

(c) a viscosity of at least 3000 poises at the liquidus temperature thereof;

(d) photochromic properties which provide, in 2 mm. thickness, a transmittance not exceeding about 55% in the fully darkened state and fading of at least 12 percentage points of transmittance in a 5-minute fading interval from the fully darkened state;

said glass being chemically strengthenable by sodium-for-lithium ion-exchange to provide a modulus of rupture strength of at least about 35,000 psi with an ion-exchange layer depth of at least about 3 mils, and (l) being essentially free of Ag, PbO and ZnO.

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4,166,746

## OPTICAL GLASS

**Kazufumi Ishibashi, Sagamihara, and Takeo Ichimura, Tokyo, both of Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan**

**Continuation of Ser. No. 742,246, Nov. 16, 1976, abandoned. This application Jun. 16, 1978, Ser. No. 916,263**

**Int. Cl.² C03C *3/14***

**U.S. Cl. 106—47 Q** **4 Claims**

1. A thorium-free composition for optical glass having a refractive index of about 1.83 to 1.93 and Abbe number of about 33 to 39 consisting essentially of, on a percent by weight basis, $B_2O_3$ 2–18; $La_2O_3$ 27–39; $Y_2O_3$ 2–12; $TiO_2$ 2–7; $GeO_2$ 11–31; $ZrO_2$ 1–8; $Ta_2O_5$ 11–37; $SiO_2$ 0–4; and BaO 0–5.

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4,166,747

## GLASS FIBER COMPOSITION

**Homer E. Neely, Jr., Tarentum, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.**

**Filed Oct. 13, 1977, Ser. No. 841,613**

**Int. Cl.² C03C *13/00, 3/08***

**U.S. Cl. 106—50** **11 Claims**

1. A glass fiber of an improved glass composition having a reduced boron content but still maintaining acceptable properties of liquidus temperature, softening point, and tensile strength consisting of 54 to 55 percent $SiO_2$, 13 to 14 percent $Al_2O_3$, 22 to 24 percent CaO, 0.2 to 0.5 percent MgO, 5.5 to 6.8 percent $B_2O_3$ and 0.7 to 1.4 percent $F_2$, and less than 1 percent of each of the other substituents including $Fe_2O_3$, $Na_2O$, $TiO_2$, $K_2O$ all percents being by weight of the composition.

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4,166,748

## PLASTIC CHROME ORE

**Nicholas Cassens, Jr., Pleasanton, Calif., assignor to Kaiser Aluminum & Chemical Corporation, Oakland, Calif.**

**Continuation-in-part of Ser. No. 827,642, Aug. 25, 1977, abandoned. This application Apr. 27, 1978, Ser. No. 900,540**

**Int. Cl.² C04B *35/42***

**U.S. Cl. 106—66** **18 Claims**

1. A substantially non-bloating plastic chrome ore refractory composition consisting essentially of: (a) from 85 to 95% size-graded chrome ore; (b) from 1 to 5% sodium silicate binder; (c) from 0.5 to 5% hectorite; and (d) from 0 to 5% of a plasticizer other than hectorite; all percentages being by weight and based on the total dry weight of the ingredients; and (e) sufficient water to form a plastic mass.

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4,166,749

## LOW DENSITY INSULATING COMPOSITIONS CONTAINING COMBUSTED BARK PARTICLES

**Robert W. Sterrett, Dunwoody, Ga.; Larry S. Shu, Newton Highlands, and Robert J. Ostertog, Milford, both of Mass., assignors to W. R. Grace & Co., Cambridge, Mass.**

**Filed Jan. 5, 1978, Ser. No. 867,037**

**Int. Cl.² C04B *7/35***

**U.S. Cl. 106—93** **23 Claims**

1. A hydratable composition which when mixed with water and allowed to hydrate hardens to a low density mass compris-

ing a hydratable inorganic binder in admixture with from about 1 to about 50 percent by weight based on said composition of a lightweight aggregate comprised of combusted bark particles obtained by partially combusting essentially the bark, in particulate form, removed from logs in a furnace.

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4,166,750

## ANHYDRITE CONCRETE AND METHOD FOR PREPARING BUILDING ELEMENTS

Robert Koeppel, Bron, France, assignor to Produits Chimiques Ugine Kuhlmann, Paris, France

Filed Jan. 9, 1978, Ser. No. 867,709
Claims priority, application France, Jan. 14, 1977, 77 01016
Int. Cl.[2] C04B *11/00*
U.S. Cl. 106—109 9 Claims

1. A method of producing a building element which comprises blending 100 parts by weight of anhydrite binder, 20 to 75 parts by weight of water, 0.05 to 5 parts by weight of at least one anhydrite setting catalyst and 300 to 900 parts by weight of heavy granulates, inserting the composition into a mold, and permitting the composition to cure.

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4,166,751

## METHOD FOR SETTING GYPSUM UTILIZING RETARDER

Azuma Komeiji, and Nobuo Murakami, both of Sodegaura, Japan, assignors to Idemitsu Kosan Co., Ltd., Tokyo, Japan

Division of Ser. No. 823,223, Aug. 10, 1977, abandoned. This application Sep. 8, 1978, Ser. No. 940,567
Claims priority, application Japan, Apr. 9, 1977, 52/39962; Apr. 18, 1977, 52/43507
Int. Cl.[2] C04B *11/18*
U.S. Cl. 106—112 19 Claims

1. An improved process for setting gypsum wherein water is admixed with gypsum to form a gypsum paste which then sets, the improvement comprising admixing a carboxylated protein in said gypsum paste in an amount of from 0.001 to 5% by weight based upon the weight of the gypsum, whereby the setting time of said gypsum is retarded.

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4,166,752

## CHEMICALLY MODIFIED ASPHALT COMPOSITIONS

Alfred Marzocchi; Michael G. Roberts, and Charles E. Bolen, all of Newark, Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Nov. 18, 1977, Ser. No. 852,898
Int. Cl.[2] C08L *95/00*
U.S. Cl. 106—273 N 9 Claims

1. A chemically modified asphalt composition prepared by reaction, at a temperature ranging from 100° to 500° C., of an asphalt with a nitrogen-containing compound selected from the group consisting of (a) ammonia, (b) a polyalkylene polyamine and (c) an aromatic diamine having the formula:

$$H_2N—R—NH_2$$

wherein R is a phenylene group or a naphthalene group.

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4,166,753

## BINDING OF REFRACTORY MATERIALS

Harold G. Emblem, and Anup K. Das, both of Bromley, England, assignors to Zirconal Processes Limited, Bromley, England

Filed Dec. 5, 1977, Ser. No. 857,761
Int. Cl.[2] C04B *31/40*
U.S. Cl. 106—308 Q 23 Claims

1. A method of producing a gellable hydrolysate, such method including the etherification step of implanting alkoxy groups onto the surface of a first substance comprising a finely divided hydrous inorganic oxide that is not inherently capable of being hydrolysed, said first substance having at least one group selected from hydroxyl, oxide or oxo bridge groups available to participate in said implant, and jointly hydrolysing the said first substance with a second inherently hydrolysable substance.

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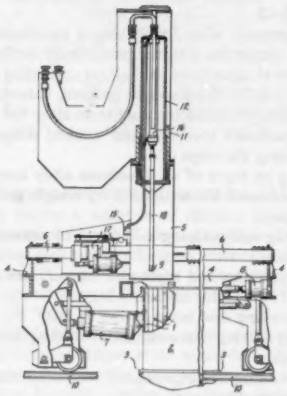
4,166,754

## PROCESS AND DEVICE FOR CLEANING CATHODE SURFACES

Wolfgang Scheel; Reiner Berns, and Wolfgang Heinen, all of Rheinberg, Fed. Rep. of Germany, assignors to Deutsche Solvay-Werke GmbH, Solingen-Ohligs, Fed. Rep. of Germany

Filed Jan. 21, 1977, Ser. No. 760,850
Claims priority, application Fed. Rep. of Germany, Jan. 21, 1976, 2602084
Int. Cl.[2] B08B *3/02, 9/00*
U.S. Cl. 134—24 38 Claims



1. A device for cleaning the surfaces of vertically oriented, adjacently situated cathodes fixed at closely spaced intervals in a cathode box, comprising:

(a) at least one horizontally oriented elongated support member;

(b) a plurality of first spraying nozzles supported by said support member for spraying a liquid under pressure against said cathode surfaces, said spraying nozzles being spaced at approximately equal distances from one another in at least one row axially along said support member and being oriented so as to spray the liquid at an angle of from about 10° to 50° with respect to the vertical surfaces of said cathodes;

(c) at least one nozzle means comprising second spraying nozzles on end portions of said support member for spraying said liquid under pressure against the edge and/or border portions of said cathodes, each of said second spraying nozzles comprising a conical cross-section jet nozzle;

(d) means for moving said support member and nozzles vertically into and out of the space formed between said adjacent cathodes, said moving means comprising at least one vertically oriented guiding bar rigidly attached to said support member, a vertically oriented piston/cylinder means connected with the guiding bar, and transporting means attached to said piston/cylinder means adapted for transporting said piston/cylinder means along a railmember;

(e) pressure resistant means supported by said support member and said guiding bar and operatively connected to each of said spraying nozzles for feeding said liquid thereto at a pressure of from about 60 to 140 atmospheres;

(f) a base which includes at least one horizontally oriented said rail member operatively connected to said transporting means;

(g) rolling means connected with the underside of said base for transporting said device; and

(h) means connected with said base and said rolling means for vertically adjusting the orientation of said base with respect to said rolling means, whereby said device can be oriented vertically with respect to the cathodes.

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4,166,755

## ALUMINUM ALLOY CAPACITOR FOIL AND METHOD OF MAKING

**Julius C. Fister, Jr., Hamden, and John F. Breedis, Trumbull, both of Conn., assignors to Swiss Aluminium Ltd., Chippis, Switzerland**

**Filed Nov. 2, 1977, Ser. No. 847,781**
**Int. Cl.[2] C22F *1/04*; C22C *21/00***
**U.S. Cl. 148—2** **16 Claims**

1. An aluminum alloy foil having a significant increase in capacitance properties which is particularly useful as foil material in electrical capacitors, said alloys consisting essentially of from 0.001 to 0.015% by weight gallium, balance aluminum.

5. A process for producing aluminum alloy foil which exhibits high capacitance levels in cold worked tempers, said process comprising the steps of:

(a) casting an ingot of an aluminum alloy consisting essentially of from 0.001 to 0.015% by weight gallium, balance aluminum;

(b) cleaning and scalping said ingot to remove any visible impurities;

(c) homogenizing said ingot at a temperature ranging from 850 to 1175° F. for at least ½ hour;

(d) hot working said ingot at 450 to 1100° F.;

(e) cooling said ingot at a minimum cooling rate of 50° F. per hour; and

(f) cold working said ingot to foil with a minimum reduction of 80% to a final gage.

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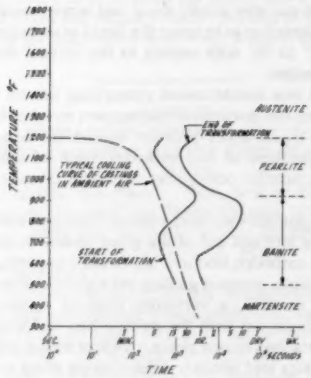
4,166,756

## RAILROAD CAR FRICTION CASTING METALLURGY

**Robert P. Geyer, Palatine; Kenneth F. Veasman, Naperville, both of Ill., and Vilakkudi G. Veeraraghavan, Coshocton, Ohio, assignors to Standard Car Truck Co., Chicago, Ill.**

**Filed Mar. 31, 1978, Ser. No. 892,142**
**Int. Cl.[2] C22C *37/00***
**U.S. Cl. 148—35** **8 Claims**




1. A wear resistant cast iron for use in railroad car trucks and other applications requiring a cast iron possessing enhanced properties of tensile strength and resistance to impact and wear having an "as cast" acicular microstructure substantially free of Pearlite and carbides and which is dumped from its sand mold at a temperature above 1250° F. consisting essentially of the following composition, before the addition of inoculant:

| Element | Percent by Weight |
|---|---|
| Carbon | 3.00–3.30 |
| Silicon | 1.20–1.50 |
| Manganese | 0.85–1.00 |
| Molybdenum | 0.80–0.90 |
| Copper | 1.40–1.60 |
| Iron (plus minor sulphur and phosphorous elements) | Balance |

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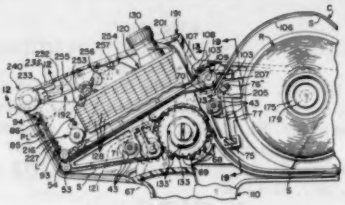
4,166,757

## HAND-HELD LABELER

**Paul H. Hamisch, Jr., Franklin, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio**

**Continuation of Ser. No. 790,519, Apr. 25, 1977, Pat. No. 4,116,747. This application Feb. 7, 1978, Ser. No. 875,836**
**Int. Cl.[2] B32B *31/00***
**U.S. Cl. 156—384** **2 Claims**



1. Hand-held apparatus for printing and applying pressure sensitive labels, comprising: a frame having a handle, means for supporting a label roll composed of pressure sensitive labels releasably secured to a web of supporting material, a manually operable actuator disposed at the handle, a subframe disposed in the space within and connected to the frame, wherein the subframe includes a pair of opposed recesses; a platen and a cooperable print head mounted on the subframe, means for delaminating printed labels, means for applying labels, a toothed feed wheel disposed in the subframe, means responsive to movement of the actuator for moving the print head into and out of printing cooperation with the platen and for advancing the feed wheel, a die roller cooperating with the toothed feed wheel, means providing a path for the web from the label roll to the platen, from there to the delaminating means, and from there to between the die roll and toothed feed wheel and partially around the feed wheel, and means connected to the subframe for biasing the die roller into mating cooperation with the feed wheel, the biasing means comprises a one-piece member including a post having end portions keyed in the recesses, a pair of leaf springs connected to the post, and a snap-socket at the free end portion of each leaf spring, the die roll having a pair of stub ends received in the respective snap-sockets.

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4,166,758

## METHOD FOR THE PRODUCTION OF A MATTED TRANSPARENT PAPER AND THE PRODUCT THEREOF

**Noritoshi Watanabe; Masato Nakamura, and Seigoro Fujita, all of Motomachi, Japan, assignors to Kanzaki Paper Manufacturing Co., Ltd., Tokyo, Japan**

**Filed Sep. 14, 1976, Ser. No. 723,137**
**Claims priority, application Japan, Sep. 18, 1975, 50-113176**
**Int. Cl.[2] D21F *13/00***
**U.S. Cl. 162—117** **8 Claims**

1. A method for the production of a matted transparent paper comprising the steps of preparing a paper from an aqueous suspension of natural pulp having a CSF larger than 100

cc, moistening said paper so as to have a moisture content within the range of 5 to 30%, and calendering said moistened paper with the use of a heated embossing metal roll having a surface temperature of 50° to 200° C. to transparentize said moistened paper and form a finely embossed surface thereon, said embossing metal roll having a peripheral surface engraved so as to have a surface roughness of a Rmax of 25 to 160 microns and a relief peak number of 1 to 20 per 1 mm.

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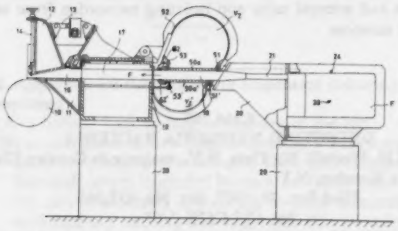
**4,166,759**

## APPARATUS FOR DAMPING PULP STOCK PRESSURE FLUCTUATIONS IN A HEADBOX

**Alvi Kirjavainen, Jyväskylä, Finland, assignor to Valmet Oy, Finland**

**Filed Oct. 5, 1977, Ser. No. 839,503**
**Claims priority, application Finland, Oct. 5, 1976, 762827**
**Int. Cl.[2] D21F *1/02, 1/06***
**U.S. Cl. 162—337** **13 Claims**



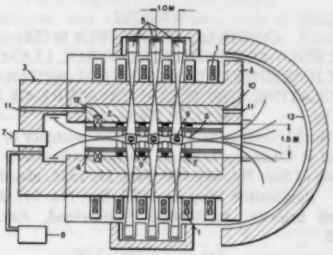
1. A paper machine headbox comprising header means for receiving pulp stock, distribution pipe means communicating with said header means for receiving pulp stock therefrom and conveying the pulp stock beyond said header means, flow-equalizing means communicating with said distribution pipe means downstream of said header means for receiving the pulp stock from said distribution pipe means and equalizing the flow of the pulp stock, turbulence passage means communicating with said flow-equalizing means downstream of said distribution pipe means for receiving the pulp stock from said flow-equalizing means and conveying the pulp stock beyond said flow-equalizing means while reducing turbulence in the flowing pulp stock, and lip slice means communicating with said turbulence passage means downstream of said flow-equalizing means for receiving the pulp stock from said turbulence passage means and delivering the pulp stock to a lip slice which forms part of said lip slice means and through which the pulp stock discharges from the headbox, said header means and flow-equalizing means forming a pair of means for respectively providing chambers in which pulp stock is situated while flowing from said header means to said lip slice means, and at least one of said pair of means including a wall means comprising a solid plate which defines part of said chamber of said one means and which is operatively connected with part of said one means for movement with respect to the remainder of said one means for altering the volume of said chamber thereof, said plate having an inner surface for contacting the pulp stock to respond to pressure fluctuations therein so as to move in response to said pressure fluctuations to change the volume of the chamber of said one means, said plate having an outer surface which is directed away from the chamber of said one means, and enclosure means for enclosing a gas such as air under pressure, said enclosure means having a hollow interior for holding therein the gas under pressure and said outer surface of said plate defining part of the hollow interior of said enclosure means so that through said plate the gas under pressure in said enclosure means acts on the pulp stock in the chamber of said one means for damping pressure fluctuations in the pulp stock.

**4,166,760**

## PLASMA CONFINEMENT APPARATUS USING SOLENOIDAL AND MIRROR COILS

**T. Kenneth Fowler, Walnut Creek, and William C. Condit, Livermore, both of Calif., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Oct. 4, 1977, Ser. No. 839,226**
**Int. Cl.[2] G21B *1/00***
**U.S. Cl. 176—3** **12 Claims**



1. An apparatus for confining a plasma using multiple magnetic mirrors within a solenoid of discrete solenoidal coils, having a magnetic field of sufficient strength to laterally confine said plasma, each not touching an adjacent solenoidal coil and each having an axis normal to a plane centered on and running through windings of the solenoidal coil the apparatus comprising:

a solenoid of discrete solenoidal coils spaced apart linearly each axis being collinear at no more than solenoidal coil radius intervals generating a magnetic field of a strength sufficient to laterally confine the plasma desired and of a solenoidal coil radius sufficieat to allow room for shielding to substantially attenuate plasma nuclear reaction products; a shield inside the solenoidal coil radius to substantially attenuate plasma nuclear reaction products;

at least three mirror coils, each mirror coil located in a coplanar manner concentrically within a discrete solenoidal coil which is at least one end of the solenoid and which is adjacent to at least one other solenoidal coil which is concentrically located about another of the mirror coils and with the at least three mirror coils generating the magnetic field maxima necessary for at least three magnetic mirrors within the solenoid with the at least three mirror coils being shielded from the plasma only by a plurality of Ioffe bars, the Ioffe bars being inside a mirror coil radius.

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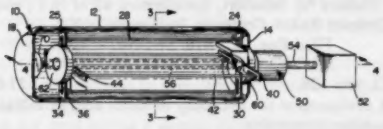
**4,166,761**

## FUSION CHAMBER

**Harry Aloupis, 515 N. Pollard St., Arlington, Va. 22203**

**Filed Feb. 7, 1978, Ser. No. 875,983**
**Int. Cl.[2] G21B *1/00***
**U.S. Cl. 176—7** **8 Claims**



1. A fusion chamber, comprising:

(a) a closed elongated evacuated container for ion plasma having an inner highly reflective surface

(b) magnetic restraining means disposed along the length of the container forming a central container energy shell for holding the plasma within its bounds

(c) a hydrogen ion source for supplying ions to the container
(d) a laser beam generator assembly disposed at one end of the container for producing a hollow laser beam which extends along the length of the container to provide an inner energy shell, and
(e) laser beam dispersion means disposed in line with the laser and at the other end of the container for receiving and deflecting the beam therefrom and toward the inner reflective surface of the container.

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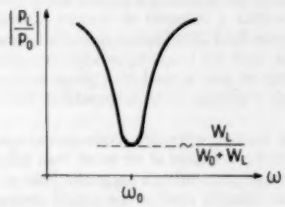
4,166,762
CONTROL APPARATUS WITH FREQUENCY-DEPENDENT CONTROL ELEMENTS AND APPLICATION OF THE CONTROL APPARATUS TO REGULATING THE STEAM PRESSURE OF BOILING WATER REACTORS

Heinz Bloch, Nussbaumen, Switzerland, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland

Division of Ser. No. 661,999, Feb. 27, 1976, abandoned. This application May 30, 1978, Ser. No. 911,055
Claims priority, application Switzerland, Apr. 16, 1975, 4817/75
Int. Cl.[2] G21C 7/00
U.S. Cl. 176—20 R 7 Claims




1. The combination with an apparatus containing a boiling water reactor providing steam to an output line of a steam piping system operatively connected with a turbine, of a control loop for regulating the magnitude of a variable quantity defined by the steam pressure prevailing in the steam piping system to a reference value, the control loop including means for measuring the instantaneous magnitude of the variable which is compared with a reference magnitude and the difference therebetween then used to activate control means in the apparatus to eliminate the difference, said control loop possessing a resonant frequency rendering such control loop unstable, said control loop including at least one bandstop filter means having a resonant frequency which at least approximately coincides with said resonant frequency at which the control loop is unstable for suppressing such resonant frequency to thereby stabilize the control loop.

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4,166,763
ANALYSIS OF LACTIC ACID OR LACTATE USING LACTATE OXIDASE

Theordore W. Esders, Webster; Charles T. Goodhue, Rochester, and Richard M. Schubert, Spencerport, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 10, 1976, Ser. No. 749,546
Int. Cl.[2] C07G 7/02; G01N 31/14
U.S. Cl. 435—28 27 Claims

1. A composition for the assay of lactic acid or lactate, said composition comprising
(A) a lactate oxidase which
(1) is capable of effecting the production of detectable hydrogen peroxide,
(2) has a specific activity of at least about 0.1μ moles lactate per minute per mg of protein,
(3) is soluble in water,
(4) is substantially catalase-free, and
(5) has a $K_m$ for lactate of at least about 0.2 mM,
(B) a substance having peroxidative activity, and
(C) a material that undergoes a detectable change in the presence of hydrogen peroxide and the substance having peroxidative activity.

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4,166,764
PRODUCTION OF MONORDEN

Gary J. Calton, Elkridge, and Marlin A. Espenshade, Ellicott City, both of Md., assignors to W. R. Grace & Co., New York, N.Y.

Filed Feb. 1, 1978, Ser. No. 874,207
Int. Cl.[2] C12D 13/02
U.S. Cl. 435—119 5 Claims

1. A process for the production of monorden which comprises cultivating *Diheterospora chlamydosporia* or a mutant thereof in a nutrient solution containing a source of carbon, nitrogen and mineral salts, and isolating monorden from said nutrient solution.

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4,166,765
DETECTING NEISSERIA BACTERIA

Howard H. Weetall, Big Flats, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Sep. 28, 1977, Ser. No. 837,366
Int. Cl.[2] C12K 1/06
U.S. Cl. 435—26 8 Claims

1. A method for detecting the presence of bacteria of the genus Neisseria in a fluid sample, the method comprising testing said sample for an enzyme capable of oxidizing 1,2-propanediol and reducing NAD.

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4,166,766
METHOD FOR QUANTITATIVE ASSAY OF ALKALINE PHOSPHATASE ISOENZYMES IN SERUM

Robert L. Metzenberg; Frank C. Larson, and Lawrence Kahan, all of Madison, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

Filed Aug. 9, 1976, Ser. No. 712,879
Int. Cl.[2] G01N 33/16
U.S. Cl. 435—21 7 Claims

1. A method of assay for fast electrophoretic alkaline phosphatase isoenzyme variant in serum comprising first subjecting the serum to ion exchange chromatography to separate the fast isoenzyme variant mobility from slow isoenzyme variants s in the serum without prior removal of protein and measuring the activity of the separated fast isoenzyme variant.

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4,166,767
INSOLUBILIZED ANTIBODY

Shigeru Kurooka, Fujiidera, and Noriyuki Sunahara, Kyoto, both of Japan, assignors to Dainippon Pharmaceutical Co., Ltd., Osaka, Japan

Filed Mar. 16, 1977, Ser. No. 778,244
Claims priority, application Japan, Mar. 25, 1976, 51-33333; Nov. 25, 1976, 51-141879
Int. Cl.[2] G01N 31/00; A61K 39/00; G01N 31/14
U.S. Cl. 435—7 24 Claims

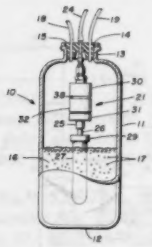
1. An insolubilized antibody for an enzyme immuno assay or radio immuno assay, which has characteristic infrared absorptions at around 1040 $cm^{-1}$, 1540 $cm^{-1}$ and 1640 $cm^{-1}$ comprising said antibody chemically bonded to cell wall debris of bacteria or yeasts whose shape is globular or rod-like.

**4,166,768**

## CONTINUOUS CELL CULTURE SYSTEM

**William R. Tolbert, Manchester; Joseph Feder, University City, and Richard C. Kimes, Creve Coeur, all of Mo., assignors to Monsanto Company, St. Louis, Mo.**

**Filed Nov. 14, 1977, Ser. No. 850,987**
**Int. Cl.[2] C12K *1/10***
**U.S. Cl. 435—286** **6 Claims**



1. Apparatus for the continuous suspension culturing of cells comprising

(A) a hollow flask having an opening at the top,

(B) an elongated hollow shaft means and a stationary sleeve assembly positioned within said flask, said elongated hollow shaft means journaled for axial rotation in said stationary sleeve assembly and being in fluid communication with said top opening and supported downwardly therefrom without any lower bearing,

(C) a filter unit supported downwardly from said shaft means without any lower bearing or moving seals between the filter unit and any filter support means which could contact the cell suspension and adapted for coaxial rotation with said shaft means, said filter having

(1) a fluid collection cavity in direct fluid communication with the interior of said shaft means and the top opening of said flask, and

(2) a porous peripheral surface having a pore size smaller than the cells to be cultured or the carrier particles upon which said cells are attached but sufficiently large to permit permeation of fluid into said fluid collection cavity.

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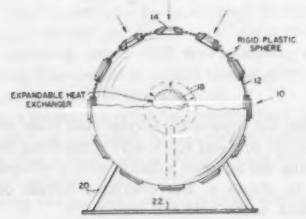
**4,166,769**

## SOLAR HEAT APPARATUS

**Joseph Dukess, 931 Greacen Point Rd., Mamaroneck, N.Y. 10543**

**Filed May 6, 1977, Ser. No. 794,448**
**Int. Cl.[2] C02B *1/04*; F24J *3/02***
**U.S. Cl. 202—234** **4 Claims**




1. A solar energy device comprising body means, an expansible and contractable member means inside said body means, lens means including a plurality of spaced focusing lenses on said body means for concentrating direct and reflected rays from the sun onto said member means to heat said member means to expand and contract said member means to direct said member means into exact convergence with the focal points of said lenses in accordance with heat from sun rays focused on said member means, heat absorbing core means in said member means, means for introducing fluid to be heated into said member means and means for removing heated fluid from said member means.

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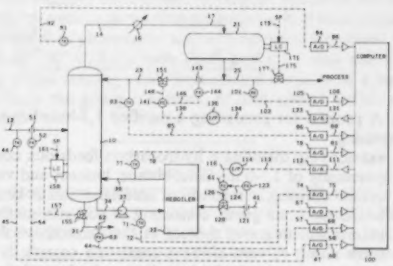
**4,166,770**

## FRACTIONATION CONTROL

**John E. Anderson, and Gary L. Funk, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed May 22, 1978, Ser. No. 908,418**
**Int. Cl.[2] B01D *3/42*; G06G *7/58***
**U.S. Cl. 203—2** **28 Claims**



1. Apparatus comprising:

a fractionation column means and an associated fired reboiler means;

first conduit means for supplying fuel to said fired reboiler means to thereby supply heat to said fractionation column means;

second conduit means for passing into said fractionation column means a feed mixture to be separated;

third conduit means for withdrawing a bottoms product from a lower portion of said fractionation column means;

fourth conduit means for withdrawing an overhead vapor stream from an upper portion of said fractionation column means;

condensing means for condensing said overhead vapor stream;

accumulator means;

means for passing the condensed overhead stream into said accumulator means;

sixth conduit means for withdrawing condensate from said accumulator means and for passing a first portion of the thus withdrawn condensate into an upper portion of said fractionation column means as external reflux therefor and for passing a second portion of the thus withdrawn condensate as an overhead product stream;

means for establishing a first signal representative of the flow rate of said fuel through said first conduit means to said reboiler means required to maintain a desired bottoms product flow rate and to maintain a desired overhead product composition;

means for controlling the flow rate of said fuel through said first conduit means to said reboiler means in response to said first signal;

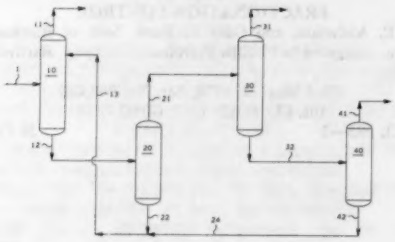
means for establishing a second signal representative of the flow rate of said external reflux to said fractionation column means required to maintain said desired bottoms product flow rate and to maintain said desired overhead product composition; and

means for controlling the flow rate of said external reflux to said fractionation column means in response to said second signal.

## 4,166,771
## BUTADIENE RECOVERY

Donald M. Haskell, Bartlesville, Okla.; Clarence G. Houser, Indiana, Pa., and Fred T. Sherk, Bartlesville, Okla., assignors to Phillip Petroleum Company, Bartlesville, Okla.

Filed Mar. 23, 1977, Ser. No. 780,335
Int. Cl.[2] B01D 3/34
U.S. Cl. 203—58 6 Claims



1. A process for producing a purified 1,3-butadiene stream comprising

a. extractively distilling a hydrocarbon feedstock consisting essentially of 1,3-butadiene, butane, butenes and vinylacetylene utilizing a mixture of sulfolane and a ketone selected from the group consisting of acetone, methylethyl ketone and mixtures thereof as the extractive solvent to form a rich solvent effluent consisting essentially of hydrocarbons, namely 1,3-butadiene, vinylacetylene and a smaller amount of butenes than the feedstock and the selective solvent, as well as a raffinate effluent,

b. stripping the rich solvent effluent under conditions sufficient to yield a lean solvent consisting essentially of sulfolane and a first portion of the ketone and an extract product consisting essentially of the hydrocarbons and a second portion of the ketone wherein said second portion of ketone is an amount sufficient to improve the subsequent separation of 1,3-butadiene and vinylacetylene, and

c. fractionally distilling said extract product to form an overhead product which consists essentially of 1,3-butadiene as said purified butadiene stream and a bottom product comprising vinylacetylene, ketone and butenes.

## 4,166,772
## EXTRACTIVE DISTILLATION SEPARATION OF CUMENE AND PHENOL

Timothy P. Murtha, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Oct. 6, 1978, Ser. No. 949,297
Int. Cl.[2] B01D 3/40; C07C 37/38
U.S. Cl. 203—60 4 Claims

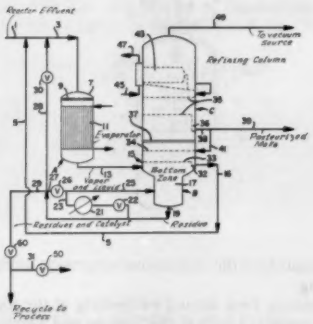
1. An extractive distillation process for the separation of cumene and phenol from a mixture containing the same which comprises utilizing as extractive distillation solvent a trisubstituted phosphate.

## 4,166,773
## CONTINUOUS PROCESS FOR SEPARATING HIGH BOILING, HEAT SENSITIVE MATERIALS

David P. Higley, Katonah, N.Y.; Gary L. Culp, Sissonville; John W. Crandall, and Scott M. Farquhar, both of Charleston, all of W. Va., assignors to Union Carbide Corporation, New York, N.Y.

Filed Dec. 22, 1977, Ser. No. 863,353
Int. Cl.[2] B01D 3/28
U.S. Cl. 203—72 11 Claims

1. A continuous process of separating higher boiling, heat sensitive components from a liquid product stream in which they are dissolved, which comprises passing such stream to an evaporator which minimizes residence time whereby the desired product of the stream is vaporized with any light components contained therein, feeding both the vaporized products and the remainder of the stream to a distillation column where the vaporized products rise in the column and the liquid residue of the stream is collected in a bottom zone at the bottom of the column, the bottom of the column is kept at a temperature which minimizes any breakdown of the heat sensitive components present therein, providing a removal point within said column for removal of at least a portion of the condensate from

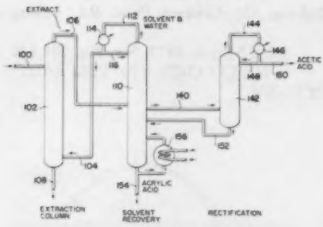



the vaporized desired product from the column and recycling a portion of the desired product removed from the column back to the column at a point below said removal point and achieving a flux of such desired product at about where the desired portion is recycled back to the column, collecting at least a portion of said flux in said column as a liquid and recycling that liquid so collected to said evaporator and removing the liquid residue collected in the bottom zone at the bottom of the column from the column.

## 4,166,774
## ACRYLIC ACID RECOVERY AND PURIFICATION

David R. Wagner, Cleveland, Ohio, assignor to The Standard Oil Company

Filed Dec. 5, 1977, Ser. No. 857,147
Int. Cl.[2] C07C 57/04; B01D 3/36; C07C 51/44
U.S. Cl. 203—82 9 Claims




1. A method for separating acrylic acid from an aqueous solution of acrylic acid and acetic acid comprising the steps of:

(a) contacting the aqueous solution with a solvent in a first column to obtain a first overhead stream of solvent, acrylic acid, acetic acid and water;

(b) distilling said first stream in a solvent recovery column having distillation trays, to obtain a second overhead stream of solvent and water, and a bottoms stream of acrylic acid;

(c) removing a vapor stream from below the feed tray of the solvent recovery column, said vapor stream containing acrylic acid and acetic acid;

(d) rectifying said vapor stream to separate and remove acetic acid.

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4,166,775

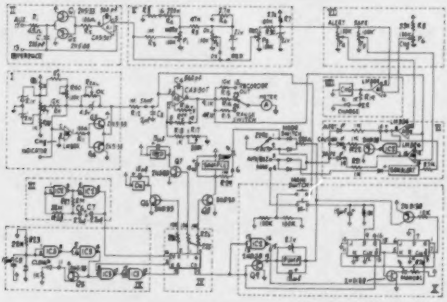
## ELECTROCHEMICAL GAS MONITORING METHOD

Stanley Bruckenstein, Williamsville, N.Y., and William G. Sherwood, Arvada, Colo., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Division of Ser. No. 655,575, Feb. 5, 1976, Pat. No. 4,057,478. This application Sep. 22, 1977, Ser. No. 835,610

Int. Cl.[2] B01J *23/96;* G01N *27/46*

U.S. Cl. 204—1 T 4 Claims



1. A method of measuring the amount of a selected oxidizable gas present in a gas mixture comprising the steps of:

disposing an indicator electrode for exposure to said gas mixture comprising a gold electrocatalyst which is permeable to said selected oxidizable gas with said electrocatalyst having a surface in contact with an aqueous acid solution to form an oxidizing interface;

applying an oxidizing potential to said electrocatalyst with said oxidizing potential being selected to allow no more than an incidental oxidation of said gold surface and said application being for a selected oxidizing time period wherein impurities adsorbed on said gold surface are oxidized therefrom;

applying a reducing potential to said electrocatalyst with said reducing potential being selected to avoid reduction of oxygen in said gas mixture and said application being for a reducing time period approximating said selected oxidizing time period to reduce said incidentally oxidized gold surface back to metallic gold;

applying a measuring potential, intermediate said oxidizing and reducing potentials, to said electrocatalyst for a measuring time period comparatively longer than said oxidizing and reducing time periods;

introducing the gas mixture into contact with said indicator electrode; and

deriving an electrical signal from said indicator electrode indicative of the oxidizing of said selected oxidizable gas which passes through said indicator electrode during the latter portion of said measuring time period to measure the amount of said selected oxidizable gas present in said gas mixture.

4,166,776

## METHOD FOR THE PREPARATION OF A PISTON MADE OF ALUMINUM ALLOY WITH ITS SURFACE TREATED SO AS NOT TO SEIZE ON CONTACT WITH A CYLINDER WITH AN INTERNAL WALL MADE OF ALUMINUM ALLOY

Jacques Lefebvre, Voiron, and Jean-Louis Mazodier, Maisons Laffitte, both of France, assignors to Societe de Vente de l'Aluminium Pechiney, Paris, France

Filed Oct. 31, 1977, Ser. No. 846,786

Claims priority, application France, Nov. 5, 1976, 76 34062

Int. Cl.[2] C25D *11/08, 11/20*

U.S. Cl. 204—25 8 Claims

1. A method for the preparation of a piston of aluminum alloy having a high silicon content of 9.4% by weight and above for operation within a cylinder in which surfaces engaged by the piston are of an aluminum alloy comprising flash coating an oxide layer onto the surfaces of the piston which operatively engages the cylinder by anodic oxidation with an alternating current in an aqueous phosphoric acid bath containing 50–300 g/l of phosphoric acid at a temperature within the range of 20°–70° C. for a very short period of time and then applying a thin coating onto the oxidized surfaces of a metal selected from the group consisting of iron, nickel, cobalt and chromium.

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4,166,777

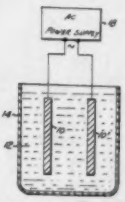
## CORROSION RESISTANT METALLIC PLATES PARTICULARLY USEFUL AS SUPPORT MEMBERS FOR PHOTO-LITHOGRAPHIC PLATES AND THE LIKE

Edward A. Casson, Jr., Easton, Md.; Albro T. Gaul, Matawan, N.J.; Eugene L. Langlais, Detroit, Mich.; Gerald Shadlen, Arnold, Md., and Eugene L. Vanaver, Dallas, Tex., assignors to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

Continuation of Ser. No. 697,199, Jun. 17, 1976, abandoned, which is a continuation of Ser. No. 609,236, Sep. 2, 1975, abandoned, which is a continuation of Ser. No. 231,767, Mar. 3, 1972, abandoned, which is a division of Ser. No. 811,267, Jan. 21, 1969, Pat. No. 3,658,662. This application Dec. 9, 1977, Ser. No. 859,244

Int. Cl.[2] C25D *11/06, 17/00*

U.S. Cl. 204—28 6 Claims



1. In a method for electrolytically forming a relatively hydrophilic layer on a surface of a metallic element consisting principally of aluminum consisting of disposing a pair of electrodes in contact with an electrolyte, said metallic element being at least one of said electrodes, and electrically connecting said electrodes across a supply of electricity for electrolytically forming on said metallic element said layer which comprises anions of said electrolyte reacted at the surface of the metallic element, the improvement consisting in dipping said electrode in an electrolyte consisting of an alkaline aqueous solution of sodium silicate containing from about 0.5 percent to about 37 percent per weight of sodium silicate, maintaining said electrolyte at a temperature between 25° C. and the boiling temperature of said electrolyte, maintaining said electrodes in said electrolyte within a distance of less than about 100 mm from each other for a duration of less than 180 seconds and connecting said electrodes to a source of alternating current of a voltage of about 9 to 220 volts.

4,166,778

## CYANIDE-FREE ALKALINE ZINC BATHS

Simeon Acimovic, Untergasse; Karl H. Lindemann, Schulstrasse 100, and Volker G. Kunz, Untergasse 46, all of 6097 Trebur, Fed. Rep. of Germany

Filed May 17, 1978, Ser. No. 907,144
Int. Cl.[2] C25D 3/22
U.S. Cl. 204—55 R 6 Claims

1. An alkaline zinc electroplating bath, free from cyanide, containing a zinc salt, an alkaline compound, and a reaction product which has been obtained by reaction of equal molar quantities of

(a) the reaction product of a nitrogen compound containing at least two reactive nitrogen atoms with an epihalohydrin, or a mixture of such reaction products, at a mole ratio of 1:1 with either

(b1) the reaction product of an alcohol or a carboxylic acid with an epihalohydrin, or a mixture of such reaction products, at a mole ratio of 1:1, or

(b2) a pyridine compound which contains 1 to 3 methyl or ethyl groups and/or 1 to 3 carboxylic groups as substituents, or both (b1) and (b2), or their salts.

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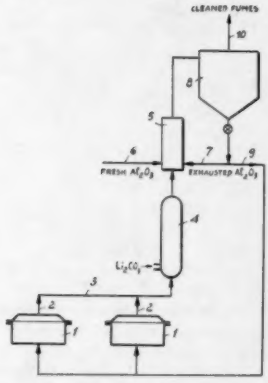
4,166,779

## ELECTROLYTIC PROCESS FOR PRODUCING ALUMINIUM

Antonio Lama, Bolzano, Italy, assignor to Societa' Alluminio e Metalli Alumetal S.p.A., Milan, Italy

Filed Feb. 18, 1977, Ser. No. 770,171
Int. Cl.[2] C25C 3/06
U.S. Cl. 204—67 3 Claims




1. An electrolytic process for producing aluminium from an electrolytic bath comprising alumina dissolved in molten cryolite, wherein lithium carbonate is used as an additive to the electrolytic bath, the improvement comprising contacting outside the bath the lithium carbonate in solid form with the hydrogen fluoride containing fumes from the electrolytic cells, in a molar ratio between lithium carbonate and the hydrogen fluoride content of the fumes less than 0.5 so as to achieve the conversion of substantially all the lithium carbonate into lithium fluoride, recovering from said fumes lithium fluoride containing suspended solids and feeding said solids to the electrolytic bath.

4,166,780

## NOVEL ELECTROLYTIC PROCESS

Giuseppe Bianchi; Oronzio De Nora, both of Milan, Italy, and Placido M. Spaziante, Lugano, Switzerland, assignors to Oronzio de Nora Impianti Elettrochimici S.p.A., Milan, Italy

Filed May 16, 1978, Ser. No. 906,656
Claims priority, application Italy, Jan. 24, 1978, 19560 A/78
Int. Cl.[2] C25B 1/16, 1/26
U.S. Cl. 204—99 8 Claims

1. In a process for electrolysis of an aqueous solution of an alkali metal halide in a mercury cathode electrolysis cell to produce halogen and alkali metal hydroxide, the improvement comprising subjecting the amalgam leaving the electrolysis to decomposition by anodic polarization under alkaline conditions to form mercury and an alkali metal hydroxide solution and subjecting the mercury to anodic polarization under acidic conditions in an electrolyte with a counter-electrode maintained at a sufficiently negative potential to remove from the mercury at least a portion of metal impurities contained and recycling the purified mercury to the electrolysis cell.

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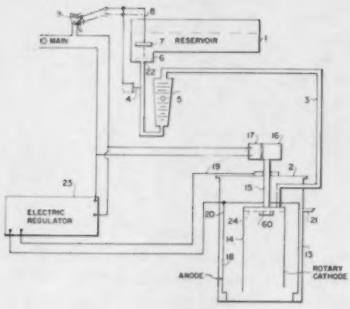
4,166,781

## RECOVERY OF SILVER FROM HYPO

Stanley F. Staples, 354 S. Pickett St., Alexandria, Va. 22304

Filed Aug. 22, 1977, Ser. No. 826,659
Int. Cl.[2] C25C 1/20, 7/00, 7/02
U.S. Cl. 204—109 14 Claims




1. An improved process of treating hypo solution and recovering silver therefrom, comprising flowing a supply of hypo solution between anodic and cathodic electrode means in an electrolyzing operation, applying silver-plating electric energy to the electrode means, automatically maintaining the amperage and the voltage of the applied energy responsive to and each at constant value corresponding to the constant volume flow rate of the hypo supplied to the electrode means, and automatically restricting the amperage to within an upper limit.

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4,166,782

## METHOD OF ANODICALLY LEVELING SEMICONDUCTOR LAYERS

David A. Collins, and Derek L. Lile, both of San Diego, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

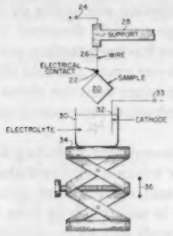
Filed Nov. 6, 1978, Ser. No. 958,459
Int. Cl.[2] C25F 3/12, 3/14
U.S. Cl. 204—129.3 5 Claims

1. A process for anodically removing only irregularities on the surface of a previously thinned semiconductor device comprising the steps of:

applying a positive voltage to the semiconductor device;

gradually immersing said semiconductor device into a thinning electrolyte to provide sufficient time for only the raised regions on the irregular surface to anodize in the

region immediately adjacent to the electrolyte surface as the device is being immersed;
removing said device from said electrolyte;
removing the oxide formed on the raised region of said device;




drying said device;
repeating said previous steps until oxide no longer forms on said semiconductor device.

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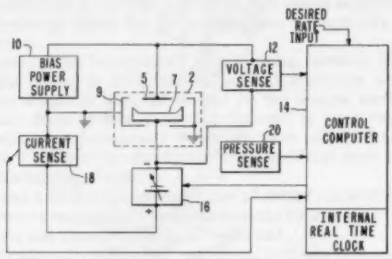
**4,166,783**

## DEPOSITION RATE REGULATION BY COMPUTER CONTROL OF SPUTTERING SYSTEMS

**Frederick T. Turner, Sunnyvale, Calif., assignor to Varian Associates, Inc., Palo Alto, Calif.**

**Filed Apr. 17, 1978, Ser. No. 897,235**
**Int. Cl.[2] C23C *15/00***
**U.S. Cl. 204—192 R** **7 Claims**




1. In a sputtering system comprising
a cathode and an anode spaced from said cathode,
controllable excitation means for supporting a plasma discharge between said cathode and said anode,
means for monitoring the power dissipated in said discharge,
means for monitoring the duration of operation for said cathode, and
computation means for continuously correcting said excitation means in response to a function of said duration and said power for maintaining the deposition rate of material at a selected value.

5. In a sputtering apparatus having a cathode and an anode in a hermetically sealed enclosure and means for maintaining a discharge between cathode and anode, the method of maintaining the sputtering deposition rate of such apparatus at a related value comprising the steps of,
introducing a selected gas into the enclosure to a desired pressure,
maintaining a plasma discharge between anode and cathode,
logging the cumulative usage time during which said cathode is subject to discharge,
sensing the parameters of said discharge, said parameters comprising the current drawn from said cathode and the potential difference between said cathode and anode,
computing the power dissipated in said discharge,
correcting a parameter of said discharge in accord with a function relating deposition rate, cumulative usage time, and said power, whereby said deposition rate is compensated for deterioration of the cathode.

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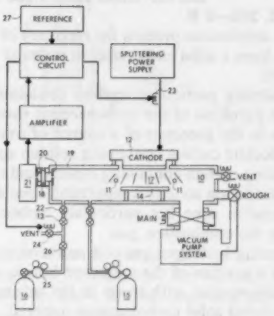
**4,166,784**

## FEEDBACK CONTROL FOR VACUUM DEPOSITION APPARATUS

**John Chapin, and Charles R. Condon, both of Boulder, Colo., assignors to Applied Films Lab, Inc., Boudler, Colo.**

**Filed Apr. 28, 1978, Ser. No. 900,996**
**Int. Cl.[2] C23C *15/00***
**U.S. Cl. 204—192 R** **27 Claims**




1. In an apparatus for depositing an intermediately reacted thin film onto a substrate, said apparatus having a chamber, a power supply, means for providing a flow of reactive gas to the apparatus, and producing a glow discharge having light intensity, a control device comprising:
converting means for converting the light intensity of the glow discharge into an electrical signal indicative of the light intensity;
comparing means for comparing the electrical output signal to a reference signal to obtain a comparison signal;
adjusting means for rapidly adjusting said flow of said reactive gas to said apparatus by venting said gas outside said chamber in response to said comparison signal to control the depositing of said intermediately reacted thin film.

13. In a process for coating an article by reactive sputtering in a sputtering apparatus including a chamber, an anode, a cathode, means for providing a flow of reactive gas, and a sputtering power supply, said apparatus emitting a glow discharge having a light intensity, the improvement comprising:
(a) converting the light intensity of the glow discharge into an electrical signal proportional to the light intensity;
(b) comparing the electrical signal to a reference signal to obtain a comparison signal; and
(c) adjusting the flow of said reactive gas in rapid response to said comparison signal by venting said gas outside said chamber to a rate which produces an intermediately reacted compound.

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**4,166,785**

## DIAPHRAGMS FOR USE IN THE ELECTROLYSIS OF ALKALI METAL CHLORIDES

**Igor V. Kadija, and Kenneth E. Woodard, Jr., both of Cleveland, Tenn., assignors to Olin Corporation, New Haven, Conn.**

**Continuation-in-part of Ser. No. 736,805, Oct. 29, 1976, Pat. No. 4,081,350. This application Feb. 27, 1978, Ser. No. 881,291**
**The portion of the term of this patent subsequent to Mar. 28, 1995, has been disclaimed.**
**Int. Cl.[2] C25B *13/04***
**U.S. Cl. 204—296** **14 Claims**

1. A diaphragm for use in the electrolysis of alkali metal chloride brines which comprises a cohesive body formed of a mixture of sand and a thermoplastic polymeric binding agent

comprised of a mixture of a polyarylene sulfide and a polyolefin compound selected from the group consisting of olefins having from 2 to about 6 carbon atoms and their chloro- and fluoro- derivatives.

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**4,166,786**

## PYROLYSIS AND HYDROGENATION PROCESS

**Kandaswamy Duraiswamy, Sterling, Va., and Bruce L. Winter, Claremont, Calif., assignors to Occidental Petroleum Corporation, Los Angeles, Calif.**

**Continuation-in-part of Ser. No. 700,048, Jun. 25, 1976, abandoned. This application Dec. 12, 1977, Ser. No. 859,852**

**Int. Cl.[2] C10G *1/00*; C10J *3/16***

**U.S. Cl. 208—8 R** **67 Claims**

1. A continuous process for recovery of liquid hydrocarbon values from a solid carbonaceous material feed comprising the steps of:

(a) oxidizing particulate carbon containing residue resulting from pyrolysis of the carbonaceous material in an oxidation zone in the presence of a source of oxygen to produce hot particulate carbon containing residue and a combustion gas;

(b) passing carbon containing residue and combustion gas from the oxidation zone to a separation zone and separating in the separation zone hot particulate carbon containing residue from the combustion gas;

(c) forming hydrogen gas in a conversion zone by reacting at least a portion of the separated hot particulate carbon containing residue with steam in the substantial absence of unpyrolyzed solid carbonaceous material;

(d) simultaneously pyrolyzing the carbonaceous material and hydrogenating pyrolysis products of the carbonaceous material by combining hydrogen gas from the conversion zone, the carbonaceous material feed, and a particulate source of heat including carbon containing residue from the conversion zone in a flash pyrolysis reaction zone having a temperature of from about 600° to about 2000° F., a pressure from ambient up to about 10,000 psig, and a solids residence time less than about 5 seconds to yield a pyrolysis product stream containing as solids, a particulate carbon containing residue of pyrolysis and particulate source of heat, and a vapor mixture comprising volatilized hydrocarbons including middle distillates and unreacted hydrogen gas;

(e) separating vapor mixture from carbon containing residue;

(f) hydrogenating volatilized hydrocarbons in separated vapor mixture with hydrogen gas of the vapor mixture in the presence of catalyst in a vapor hydrogenation zone; and

(g) condensing hydrocarbons including middle distillates from the hydrogenated vapor mixture.

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**4,166,787**

## SULFUR OXIDES CONTROL IN CATALYTIC CRACKING

**William A. Blanton, Jr., San Anselmo, and Joseph Jaffe, Berkeley, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.**

**Filed Dec. 16, 1977, Ser. No. 861,320**

**Int. Cl.[2] C10G *11/04*; B01J *21/20*; C01B *17/60***

**U.S. Cl. 208—120** **10 Claims**

1. In a fluid catalytic cracking process including the steps of (a) cracking a sulfur-containing hydrocarbon stream in contact with a fluidized bed of cracking catalyst particles, said particles containing a silica component, in a cracking zone at cracking conditions including a temperature in the range from 800° F. to 1300° F., whereby sulfur-containing coke is deposited on said catalyst, and removing the hydrocarbon stream from said cracking zone; (b) passing coke-containing catalyst from said cracking zone and an oxygen-containing gas into a cracking catalyst regeneration zone, burining off said sulfur-containing coke therein at a temperature in the range from 1000° F. to 1500° F. to form a flue gas containing sulfur oxides, and removing said flue gas from said catalyst regeneration zone; and (c) returning the resulting coke-depleted catalyst from said catalyst regeneration zone to contact with said hydrocarbon stream in said cracking zone, the improved method for decreasing the amount of sulfur oxides in said flue gas which comprises:

(1) physically incorporating into at least a portion of said catalyst particles, before contacting said catalyst particles with said feed, from 0.1 to 25 weight percent of a finely divided solid consisting essentially of alumina, said solid having an average particle diameter of less than 50 microns, said alumina having a surface area of between 40 to 400 square meters per gram, and said alumina having been heated to a temperature between about 700° F. and about 1600° F. before physical incorporation into said catalyst particles;

(2) forming a solid compound including a sulfur component by reacting sulfur trioxide with said alumina in said finely divided solid in said regeneration zone; and (3) forming hydrogen sulfide in said cracking zone by contacting said solid compound with said hydrocarbon stream.

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**4,166,788**

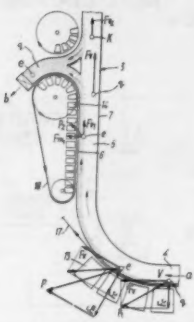
## METHOD OF CONCENTRATING MAGNETIC ORE AND MAGNETIC CENTRIFUGAL SEPARATOR FOR EFFECTING THE METHOD

**Efim L. Druz, and Jury E. Druz, both of Dnepropetrovskoi oblasti, ulitsa Ordzhonikidze, 36, kv.8, Krivoi Rog, U.S.S.R.**

**Filed Dec. 8, 1976, Ser. No. 748,714**

**Int. Cl.[2] B03C *1/02, 1/30***

**U.S. Cl. 209—39** **9 Claims**



1. A method of concentrating magnetic ore comprising the steps of:

forcing a flow of magnetic ore to move in a fluid medium along guides having curved and rectilinear portions;

generating a first pulsating magnetic flux;

combining a centrifugal force, directed in the same direction as said first pulsating magnetic flux, with said first pulsating magnetic flux in said curved portions;

forcing heavy magnetic particles of said flow of magnetic ore against an outer side of said curved portions, by means of interation between said first pulsating magnetic flux, said centrifugal force and said magnetic particles, to form a layer of a magnetic fraction;

expelling less heavy nonmagnetic particles, by means of said centrifugal force, to form a layer of a nonmagnetic fraction;

generating a second pulsating magnetic flux in a direction at right angles to said flow of magnetic ore in said rectilinear portions;

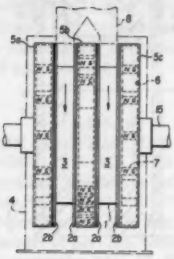
slowing down said layer of the magnetic fraction in said rectilinear portions by means of said second pulsating magnetic flux; and

moving said layer of the magnetic fraction at a relatively low speed and moving said layer of the nonmagnetic fraction at a relatively high speed in said flow of magnetic ore to vary the concentration of said magnetic ore.

## 4,166,789
## MAGNETIC SEPARATOR

Yukio Imai; Kunio Takeda, and Jiro Terukina, all of Kobe, Japan, assignors to Kobe Steel, Ltd., Kobe, Japan

Filed May 30, 1978, Ser. No. 910,430
Claims priority, application Japan, Aug. 27, 1977, 52-103048; Aug. 27, 1977, 52-103049; Sep. 2, 1977, 52-106078; Sep. 7, 1977, 52-108284
Int. Cl.[2] B03C 1/12
U.S. Cl. 209—219 10 Claims



1. A magnetic ore separation apparatus comprising:
a casing;
a feed hopper for a raw material to be separated connected to said casing;
a discharge chute connected at a lower portion of said casing for concentrate magnetically separated;
a discharge chute for tailing likewise magnetically separated connected to a lower portion of said casing adjacent said discharge chute for the concentrate magnetically separated;
a rotary drum incorporated in said casing, turnably pivoted and having at least first and second separation walls of non-magnetic material formed on the outside surface of said drum and defining therebetween at least one feed separation passageway extending from said feed hopper on the side of the direction of rotaton of said drum to said discharging chutes;
at least a first and a second series of radially extending stationary magnetic poles disposed at the back of both of said first and second separation walls; and
a plurality of cases within which each of said first and second series of stationary magnetic poles is disposed wherein each of said series of stationary magnetic poles extend along said feed separation passageway from the upper center circumference of said casing to the lower outer circumference of said casing.

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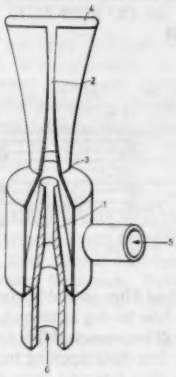
## 4,166,790
## SINGLE STAGE PROCESS FOR CONTINUOUS INTRODUCTION OF OXYGEN-CONTAINING GASES INTO EFFLUENT CONTAINING ACTIVATED SLUDGE

Marko Zlokarnik, Cologne; Hans Guth, Bergisch-Neukirchen, and Theo Mann, Langenfeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 677,655, Apr. 16, 1976, abandoned. This application Apr. 22, 1977, Ser. No. 790,108
Claims priority, application Fed. Rep. of Germany, Apr. 17, 1975, 2516914; Feb. 9, 1977, 2705243
Int. Cl.[2] C02C 1/12
U.S. Cl. 210—15 6 Claims

1. A process for the continuous introduction of air or oxygen-containing gases into an effluent containing activated sludge, the oxygen largely being consumed by the effluent containing activated sludge in a single absorption stage, comprising introducing into a basin housing the activated sludge under its own hydrostatic pressure of about 0.9 to 3 bars air or oxygen-containing gas at a pressure of about 0.01 to 0.5 m head of water above the hydrostatic pressure at the point at which the gas is introduced, the gas being introduced through injectors each having a liquid jet nozzle with a throat diameter of about 8 to 16 mm, the injectors being charged with a gas throughput of about 5 to 100 effective $m^3/h$, the liquid jet



throughput amounting to about 60 percent by volume of the gas throughput measured in effective $m^3$, the injectors being located up to 1 m above the basin bottom, one being provided per 1 to 5 $m^2$ of floor area of the basin.

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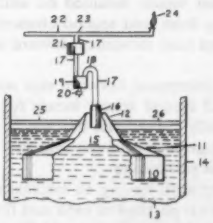
## 4,166,791
## SEWAGE GAS COLLECTION RESERVOIR

Mark C. Marvin, 25 Floral Rd., Peekskill, N.Y. 10566

Filed Aug. 4, 1977, Ser. No. 821,798
Int. Cl.[2] C02C 1/14
U.S. Cl. 210—120 3 Claims

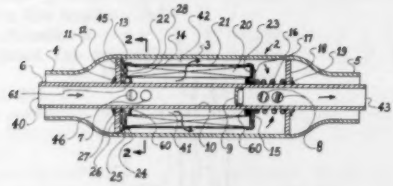


1. A sewage gas collection reservoir comprising:
a. a gas collecting reservoir capable of being contained within the walls of a sewage tank,
b. support rods connected to said gas collecting reservoir, anchoring said reservoir in a sewage containing tank,
c. said reservoir containing a top port, the opening of said top port which is regulated by a float valve which is capable of preventing the sewage level from passing through said top port,
d. gas transport tubing connecting said top port to a terminal fixture, at said terminal fixture, where gas which is received from said tubing is capable of being fed into a gas line,
e. said tubing containing a one-way valve which is capable of preventing the back flow of gas into said reservoir.

## 4,166,792
## IN-LINE FLUID FILTER

Robert J. Offer, and James V. Dieringer, both of Racine, Wis., assignors to Tenneco Inc., Racine, Wis.

Filed Oct. 24, 1975, Ser. No. 625,587
Int. Cl.[2] B01D *27/10, 35/02*
U.S. Cl. 210—131 3 Claims



1. An in-line fluid filter assembly comprising:

an inlet/outlet tube having a first end, a second end, a continuous tube wall between said first end and said second end, at least one first fluid opening in said tube wall for enabling fluid flow laterally from said tube, at least one second fluid flow opening in said tube wall axially spaced along said tube wall from said first opening for enabling fluid flow laterally into said tube and seal means for preventing fluid flow through said tube between said first opening and said second opening;

a first spacer means on said tube and restrained from axial movement toward said first end of said tube;

a first seal means sealingly engaged with the peripheral surface of said inlet/outlet tube adjacent said first spacer means and covering substantially all of a surface of said first spacer means facing said second end of said tube;

a filter element comprising an annulus of a filter medium and having a first end sealingly engaged with a first element end cap adjacent said first seal means and a second end sealingly engaged with a second element end cap and said first fluid flow opening in said tube wall being surrounded by said filter element;

seal means sealingly engaging said second element end cap and the peripheral surface of said tube adjacent said second element end cap;

a second spacer means mounted on said tube and spaced axially away from said second element end cap and restrained from axial movement toward said second end of said tube;

spring means interposed between said second element end cap and said second spacer means for urging said filter element axially toward said first spacer means for causing sealing engagement between said first element end cap and said first seal means;

a tubular outer shell having an internal surface in contact with peripheral portions of each said first and said second spacer means for enveloping said filter element and substantially all of said inlet/outlet tube;

a first swaged down end portion of said outer shell concentric with and diametrically larger than said first end of said inlet/outlet tube for forming a first annular space between said shell and said tube;

a second swaged down end portion of said outer shell concentric with and diametrically larger than said second end of said inlet/outlet tube for forming a second annular space between said shell and said tube;

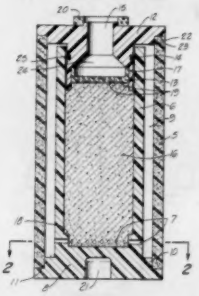
resilient conduit means sealing secured in said first annular space for directing fluid into said first end of said tube and preventing fluid flow through said first annular space; and

resilient conduit means sealing secured in said second annular space for directing fluid out of said second end of said tube and preventing fluid flow through said second annular space.

## 4,166,793
## FILTER-PURIFIER CARTRIDGE HAVING SEPARABLE ELEMENTS

Isadore Turetsky, 23940 Welby Way, Canoga Park, Calif. 91307

Filed Aug. 17, 1978, Ser. No. 934,421
Int. Cl.[2] B01D *27/00*
U.S. Cl. 210—315 9 Claims



1. A filter-purifier cartridge for liquids adapted to be inserted in a filter apparatus, comprising: a tubular purifier element containing purifying medium within its hollow core and having an integral cartridge end closure at its bottom end, and circumferentially disposed passages through the wall of the lower end section of said purifier element; said tubular purifier element inserted into the hollow core of a tubular filter, one end of said tubular filter being sealed and spaced from the sidewall of the purifier element by means of said cartridge end closure to form an annular space which communicates with the hollow core of the purifier element by means of said circumferentially disposed passages; a manually separable top end member being joined to the upper end section of the tubular purifier element maintains the spaced relationship of the tubular filter with the sidewall of said purifier element, the adjacent end of the tubular filter and said annular space being sealed by said top end member; a concentric discharge passage through said top end member communicates with the hollow core of said tubular purifier element, said separable top end member retaining a foraminous member disposed above the purifying medium within the hollow core of said purifier element.

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## 4,166,794
## LIQUID BLEACH-SOFTENER COMPOSITIONS

Seymour Grey, Somerset, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed May 25, 1978, Ser. No. 909,592
Int. Cl.[2] D06M *13/36*
U.S. Cl. 252—8.8 15 Claims

1. A liquid bleach, fabric-softener composition beneficially adapted for use in one or more of the wash, rinse and tumble drying cycles of a fabric-laundering process consisting essentially of, by weight, from about 3 to 10% of water soluble peroxy bleaching agent, at least about 50% thereof being hydrogen peroxide and from about 3 to 25% of water soluble fabric softener compound, at least about 50% thereof being cationic amine softener, the weight ratio of softener to peroxy bleach being from about 5:7 to 5:1, the balance of said composition being water or a mixture of water with up to about 10% of water soluble lower alkanol.

4,166,795

## CHEMICAL REACTION PRODUCT OF SULFUR, LARD OIL AND POLYISOBUTYLENE

Alexander D. Recchuite, Boothwyn, Pa., assignor to Suntech, Inc., Philadelphia, Pa.

Filed Apr. 26, 1971, Ser. No. 137,556
Int. Cl.[2] C10M *1/38, 3/32;* C07G *17/00*
U.S. Cl. 252—48.6 11 Claims

1. As a composition of matter, a co-sulfurized blend of from 30 to 90 parts by weight of lard oil and from 70 to 10 parts by weight of polyisobutylene containing from 12 to 40 carbon atoms which co-sulfurized blend contains chemically combined therewith from 5 to 25 weight percent of sulfur as based on said blend and wherein said blend contains no more than 18 weight percent of active sulfur.

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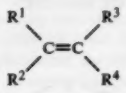
4,166,796

## COMPOSITION COMPRISING A COSULFURIZED BLEND OF LARD OIL AND AN OLEFIN

Alexander D. Recchuite, Boothwyn, Pa., assignor to Suntech, Inc., Philadelphia, Pa.

Continuation of Ser. No. 220,399, Jan. 24, 1972, which is a continuation-in-part of Ser. No. 135,466, Apr. 19, 1971, abandoned. This application May 15, 1978, Ser. No. 905,909
Int. Cl.[2] C10M *1/38, 5/22;* C09B *49/00;* C07G *17/00*
U.S. Cl. 252—48.6 15 Claims

1. A composition comprising a consulfurized blend of 50 to 90 parts by volume o a triglyceride wherein the fatty acid moieties of said triglyceride contain principally from 9 to 22 carbon atoms and at least about 45 mole percent of the fatty acid moieties present contain one ethylenically unsaturated carbon-carbon double bond and wherein said fatty acid moieties are hydrocarbons except for the carboxylic group of said fatty acid moieties, and from 50 to 10 parts by volume of a hydrocarbon containing from 2 to about 24 carbon atoms and having the structure



wherein $R^1$, $R^2$ and $R^3$ are either hydrogen or alkyl and $R^4$ is either hydrogen, alkyl, aryl, cycloalkyl or alkaryl, which consulfurized blend contains chemically combined therewith from 16 to 25 weight percent as based on said blend of sulfur of which from 5 to 18 weight percent is active sulfur.

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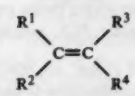
4,166,797

## OIL CONTAINING A CONSULFURIZED OLEFIN-TRIGLYCERIDE BLEND

Alexander D. Recchuite, Boothwyn, Pa., assignor to Suntech, Inc., Philadelphia, Pa.

Continuation of Ser. No. 397,473, Sep. 14, 1973, which is a division of Ser. No. 220,399, Jan. 24, 1972, which is a continuation-in-part of Ser. No. 135,466, Apr. 19, 1971, abandoned. This application May 15, 1978, Ser. No. 905,910
Int. Cl.[2] C10M *1/38, 3/32, 5/22, 7/36*
U.S. Cl. 252—48.6 14 Claims

1. A composition comprising a major portion of a mineral oil of lubricating viscosity and a minor portion sufficient to improve the extreme pressure properties of said oil of a cosulfurized blend of from 70 to 88 parts by volume of a triglyceride wherein the fatty acid moieties of said triglyceride contain principally from 9 to 22 carbon atoms and at least about 45 mole percent of the fatty acid moieties present contain an ethylenically unsaturated carbon-carbon double bond and wherein said fatty acid moieties are hydrocarbons except for the carboxylic group of said fatty acid moieties, and from 30 to 12 parts by volume of a hydrocarbon containing from 2 to about 24 carbon atoms and having the structure



wherein $R^1$, $R^2$ and $R^3$ are either hydrogen or alkyl and $R^4$ is either hydrogen, alkyl, aryl, cycloalkyl, or alkaryl, which cosulfurized blend contains chemically combined therewith from 7.5 to 25 weight percent as based on said blend of sulfur, said composition being substantially free of haze after 16 hours at 36° F.

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4,166,798

## ELECTRICAL DEVICE WITH FLUORINATED DIVALENT SULFUR DIELECTRIC GAS

Martin J. Mastroianni, East Aurora; Sabatino R. Orfeo, Orchard Park, and Bernard Sukornick, Williamsville, all of N.Y., assignors to Allied Chemical Corporation, Morris Township, Morris County, N.J.

Filed Aug. 21, 1978, Ser. No. 934,758
Int. Cl.[2] H01B *3/56*
U.S. Cl. 252—63.5 10 Claims

1. In an improved high voltage electrical apparatus having at least two electrical conductors separated by an insulative dielectric gas subject to an electrical field, the improvement wherein the insulative dielectric gas comprises between about 0.5 and 100 mole % of a divalent sulfur compound selected from the group consisting of tetrafluororthiirane, hexafluorothietane, bis (trifluoromethyl) sulfide, perfluoromethyl ethyl thioether, perfluorodiethyl thioether, trifluoromethyl thiocyanate and mixtures thereof and 0 to about 99.5 mole % sulfur hexafluoride.

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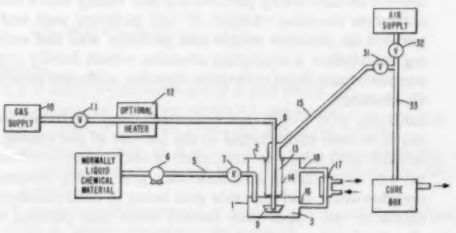
4,166,799

## APPARATUS FORMATION OF GASEOUS MIXTURES AND METHOD OF USE

Frederick Giacobbe, Hanover, Pa., assignor to Chemetron Corporation, Chicago, Ill.

Filed Oct. 31, 1977, Ser. No. 847,208
Int. Cl.[2] B22C *1/22, 9/12*
U.S. Cl. 252—182 9 Claims




1. A method for substantially saturating a carrier gas with a predetermined concentration of vapors of a normally liquid chemical material which comprises:

(a) passing a dispersion of a carrier gas at a predetermined pressure through a normally liquid chemical material at a predetermined temperature; and then

(b) passing the resultant carrier gas associated with a portion of said liquid through a gas permeable means, wettable by said liquid, which retards the passage of the associated liquid, while providing intimate contact of the carrier gas with liquid retained on the gas permeable means;

(c) thereby producing a product gas mixture comprising said carrier gas substantially saturated with vapors of said liquid.

4,166,800

## PROCESSES FOR PREPARATION OF MICROSPHERES

Jones W. Fong, Parsippany, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Continuation-in-part of Ser. No. 926,261, Jul. 20, 1978, abandoned, which is a continuation-in-part of Ser. No. 827,710, Aug. 25, 1977, abandoned. This application Jul. 31, 1978, Ser. No. 929,517

Int. Cl.[2] B01J *13/00*

U.S. Cl. 252—316 45 Claims

1. In a process for the preparation of microspheres having a particulate core material encapsulated by a polymeric coating wherein the polymer is dissolved in a solvent in which the core material is not soluble and the polymer is precipated by phase separation to encapsulate the core material by the addition of phase separation agent to the polymer-core material-solvent system; the improvement which comprises lowering the temperature of said system from about −40° to −100° C. and then adding the phase separation agent to the polymer-core material-solvent system to cause phase separation of the polymer.

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4,166,801

## FOAM ELIMINATING DEVICE

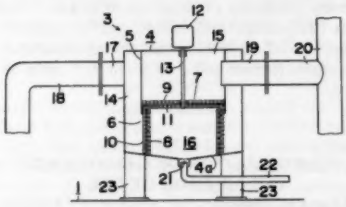
Tsunemitsu Shimomoto, Yokohama, Japan, assignor to Ataka Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Nov. 5, 1976, Ser. No. 739,138

Claims priority, application Japan, Nov. 6, 1975, 50-133367

Int. Cl.[2] B01D *19/02*

U.S. Cl. 252—361 4 Claims




1. A foam eliminating device comprising:

a casing having a bottom;

a substantially vertical partition wall fixed at the upper end thereof on said casing partitioning said casing into a foam collection chamber exterior of said partition wall and a purified air chamber within said partition wall and defining therebelow a separation chamber which fluidly communicates said foam collection chamber with said purified air chamber;

a stationary grid within said separation chamber below said partition wall and secured to the bottom of the casing;

a movable grid rotatably journalled in said separation chamber and surrounding said stationary grid with a clearance therebetween, said movable grid being in fluid communication at the upper end thereof with said purified air chamber; and

means for rotating said movable grid to pulverize foam passing from said foam collection chamber into said purified air chamber.

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4,166,802

## GASIFICATION OF LOW QUALITY SOLID FUELS

William L. Slater, La Habra, and George N. Richter, San Marino, both of Calif., assignors to Texaco Inc., White Plains, N.Y.

Filed Apr. 20, 1978, Ser. No. 897,981

Int. Cl.[2] C01B *2/00*; C10J *3/00*

U.S. Cl. 252—373 9 Claims

1. A process for the gasification of a solid carbonaceous fuel selected from the group consisting of sub-bituminous coal and lignite which comprises forming an initial slurry of said fuel in water, containing less than 50 weight percent solids, contacting said initial slurry with hot synthesis gas comprising carbon monoxide and hydrogen in a quench zone thereby cooling said gas and heating said initial slurry to a temperature between about 400° F. and 700° F., the pressure in said quench zone being sufficiently high to keep the water in liquid phase, maintaining the slurry under said conditions of temperature and pressure for a period of time between 0.1 minute and 1 hour, subjecting the so treated fuel as a concentrated water slurry containing between about 50 and 75 wt. % solids measured on a dry basis to partial oxidation to produce additional synthesis gas comprising carbon monoxide and hydrogen and introducing said additional synthesis gas into said quench zone to heat additional initial slurry and quench said additional synthesis gas.

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4,166,803

## HETEROCYCLIC BENZOATE ULTRAVIOLET STABILIZERS AND THEIR USE IN ORGANIC COMPOSITIONS

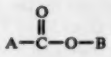
Gether Irick, Jr.; James C. Ownby, and Richard H. S. Wang, all of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 9, 1978, Ser. No. 868,085

Int. Cl.[2] C07D *401/10*; C08K *5/34, 5/35, 5/47*

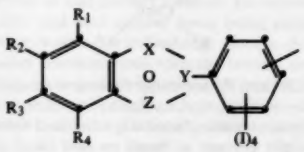
U.S. Cl. 252—402 28 Claims

28. An organic composition susceptible to ultraviolet light degradation stabilized against such degradation with a stabilizing amount of at least one piperidinyl ester having the formula:



wherein

A is a group having the structure




wherein

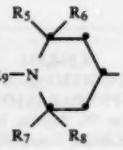
X and Y are a carbon atom or a nitrogen atom;

Z is an oxygen atom, a sulfur atom, a nitrogen atom, or a nitrogen atom containing a hydrogen atom or an unsubstituted or substituted lower alkyl group having 1 to 12 carbon atoms;

$R_1$, $R_2$, $R_3$ and $R_4$ are hydrogen, chloro, bromo, lower alkyl, substituted lower alkyl, cycloalkyl, substituted cycloalkyl, aryl, substituted aryl, lower alkylaryl, aryl-substituted-aryl, alkoxy, substituted amino, cyano, and the substituents $R_1$ and $R_2$, $R_2$ and $R_3$, and $R_3$ and $R_4$ combined with the carbon atoms to which they are attached are joined alkylene groups completing a carbocyclic ring, which ring can also be substituted with one or more of the substituents listed above for $R_1$, $R_2$, $R_3$ and $R_4$;

I is the same as $R_1$, $R_2$, $R_3$ and $R_4$ and is present on all positions of the benzenoid ring, except the carbon atom attached to the Y atom and the carbon atom attached to the carboxyl group connecting the heterocyclic aromatic A group with the B group, said carbonyl connecting group being attached to the benzenoid ring in either the meta or para position from the carbon atom connected to the Y atom; and

B is a group having the formula



wherein

$R_5$ and $R_6$ are each alkyl having 1–6 carbons; $R_7$ and $R_8$ are each alkyl having 1–6 carbons or together with the carbon to which they are bound form a cyclopentyl or cyclohexyl ring, which is unsubstituted or substituted with a methyl group; and $R_9$ is hydrogen, oxyl, alkyl having 1 to 12 carbon atoms, β-methoxyethyl, alkenyl having 3 or 4 carbon atoms, propargyl, benzyl or alkyl substituted benzyl.

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**4,166,804**

## POLYMERIC COLOR INDICATORS AND A METHOD OF THEIR PREPARATION

**Miroslav Bleha; Zdeněk Plichta; Eva Votavová, and Jaroslav Kálal, all of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia**

**Filed Oct. 14, 1977, Ser. No. 842,273**

**Claims priority, application Czechoslovakia, Oct. 21, 1976, 6778-76**

**Int. Cl.[2] G01N *21/08;* C08J *9/00;* C08F *8/30***

**U.S. Cl. 252—408** **9 Claims**

1. Polymeric color changing pH indicators insoluble in aqueous medium when used for pH measurement thereof, said indicators being prepared by free radical polymerization of at least one comonomer selected from the group consisting of acrylic esters, methacrylic esters, acrylamide, methacrylamide, N-methylacrylamide, N-methylmethacrylamide, N-ethylacrylamide, N-ethylmethacrylamide, N-hydroxypropylmethacrylamide, and N-hydroxypropylmethylacrylamide, with from 0.1 to 30 weight percent of a functional monomer selected from the group consisting of N-ethyl-N-(2-methacryloyl) aniline and N-ethyl-N-(2-methacryloylethyl)-N′-acetyl-p-phenylenediamine to form a polymer, subsequently diazo-coupling said polymer with an aromatic active agent through the available functional sites of said monomer and functionally active sites of said agent. to set a pH color indicating center in said polymer.

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**4,166,805**

## RANEY CATALYSTS

**Peter Jowett, Rivington, 33 Strines Rd., Marple, Cheshire, England (SK6 7DT)**

**Filed May 19, 1977, Ser. No. 798,541**

**Int. Cl.[2] B01J *25/00, 25/02, 31/02***

**U.S. Cl. 252—430** **17 Claims**

1. A hydrogenation catalyst consisting essentially of Raney Catalyst pyrophoric in the dry state active for hydrogenation dispersed in an aliphatic primary, secondary or tertiary amine, a diamine or a cyclic amine, said amine or diamine having at least one chain of 8 to 22 carbon atoms, or a salt of such an amine or diamine, said hydrogenation catalyst having been prepared by blending the amine, diamine or salt with a mixture of said Raney Catalyst active for hydrogenation and water.

**4,166,806**

## CRACKING CATALYST PASSIVATED WITH A CRUDE ANTIMONY PHOSPHORODITHIOATE

**Dwight L. McKay, and Brent J. Bertus, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Jul. 25, 1978, Ser. No. 926,699**

**Int. Cl.[2] C10G *11/06;* B01J *8/24, 21/21***

**U.S. Cl. 252—437** **4 Claims**

1. A cracking catalyst suitable for cracking a hydrocarbon which has been treated to passivate a contaminating metal whenever it appears thereon by incorporating with said catalyst, a crude antimony tris(O,O-dihydrocarbyl phosphorodithioate).

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**4,166,807**

## OXYGEN ABSORBENT

**Toshio Komatsu, Tokyo; Yoshiaki Inoue, Mizumoto-Tizuka, and Megumu Yuyama, Tokyo, all of Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan**

**Filed Nov. 28, 1977, Ser. No. 855,316**

**Claims priority, application Japan, Dec. 8, 1976, 51-147452**

**Int. Cl.[2] B01J *27/02, 31/02, 27/14, 27/20***

**U.S. Cl. 252—439** **34 Claims**

1. An oxygen absorbent comprising iron containing sulfur in an amount of from 0.05 to 5% based on the weight of iron, and at least one metal halide, in an amount of from 0.001 to 300 parts by weight per 100 parts by weight of the iron.

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**4,166,808**

## NOVEL CATALYST FOR OXIDIZING OLEFINS IN α,β-UNSATURATED ALDEHYDES AND PREPARATION THEREOF

**Jean-Claude Daumas, Orsay; Jean-Yves Derrien, Bourg-la-Reine, and Francis Van den Bussche, Ris-Orangis, all of France, assignors to Rhone-Poulenc Industries, Paris, France**

**Filed Sep. 12, 1977, Ser. No. 832,210**

**Claims priority, application France, Sep. 14, 1976, 76 27531**

**Int. Cl.[2] B01J *29/06, 29/16, 23/14***

**U.S. Cl. 252—455 R** **25 Claims**

1. A catalyst composition comprising a catalytically active metal oxide component containing the oxides of cobalt, molybdenum, bismuth and iron corresponding to the empirical formula

$$Co_a\ Mo_{12}\ Fe_b\ Bi_c\ O_x$$

wherein

a is a value of between about 8 and about 10;

b is a value of between about 0.5 and about 2;

c is a value of between about 0.5 and about 2; and,

x equals the sum of $1.5c+1.5b+a+36$, and including a crystalline phase having the empirical formula $Bi_2\ Mo_2\ Fe_2\ O_{12}$.

14. A process for preparing a catalyst composition as defined in claim 1, which comprises the steps of

(a) preparing a liquid reaction mixture comprising water, a cobalt salt, a molybdenum salt, a bismuth salt and an iron salt, wherein the amount of the salts is equivalent to a ratio of about 8 to about 10 parts per atom of cobalt to about 0.5 to about 2 parts per atom of iron to about 0.5 to about 2 parts per atom of bismuth to about 12 parts per atom of molybdenum;

(b) reacting said mixture to form a suspension;

(c) eliminating a sufficient amount of water from the suspension to obtain a paste;

(d) drying said paste to obtain a solid material;

(e) subjecting said solid material to a first calcining step at a temperature of between about 450° and about 500° C. to obtain a calcination product;

(f) cooling the calcination product to about ambient temperature; and,

(g) subjecting the cooled calcination product to a second calcining step at a temperature of between about 450° and about 500° C.

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**4,166,809**

## CELLULOSE PROPIONATE N-BUTYRATE AND COATING COMPOSITIONS CONTAINING SAME

**Richard J. Brewer, and Willis C. Wooten, Jr., both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Dec. 22, 1977, Ser. No. 863,197**
**Int. Cl.[2] C08L *1/14***
**U.S. Cl. 260—16** **6 Claims**

1. Cellulose propionate n-butyrate having, by weight, from about 3 to about 5% butyryl content, from about 40 to about 50% propionyl content, and from about 2% to about 3% free hydroxyl content.

2. A coating composition comprising

(a) from about 5% to about 95% by weight, based on non-volatiles, of cellulose propionate n-butyrate having an n-butyryl content of between about 3 and about 5%, a propionyl content of between about 40 and about 50% and a hydroxyl content of between about 2 and 3%,

(b) from about 95% to about 5% by weight, based on non-volatiles, of an oil-containing alkyd resin having a molecular weight of from about 1500 to about 4000, and

(c) a solvent in an amount sufficient to provide said coating composition with a non-volatile content of from about 20% to about 30% by weight.

3. A substrate having applied to a surface thereof the coating composition of claim 2.

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**4,166,810**

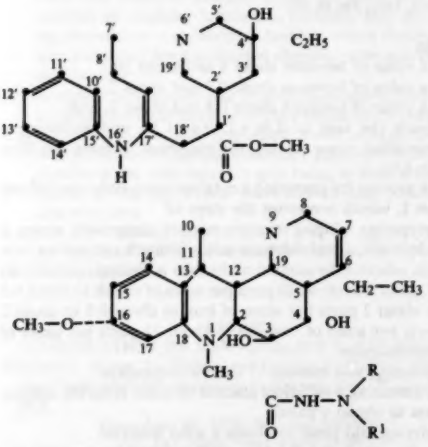
## DERIVATIVES OF 4-DESACETYL VLB C-3 CARBOXYHYDRAZIDE

**George J. Cullinan, Trafalger, and Koert Gerzon, Indianapolis, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.**

**Filed Apr. 20, 1978, Ser. No. 899,032**
**Int. Cl.[2] C07D *519/04***
**U.S. Cl. 260—244.4** **6 Claims**

1. A compound of the formula

I



wherein R, when taken singly, is β-hydroxyethyl, β-acetoxyethyl, $C_2$–$C_4$ alkanoyl, dichloroacetyl, benzoyl or $C_1$–$C_3$ alkyl carbazyl;

$R^1$, when taken singly, is H; and

R and $R^1$, when taken together, form a $C_1$–$C_3$ alkylidene group.

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**4,166,811**

## PIGMENT COMPOSITIONS AND METHODS OF PREPARATION

**Peter W. Marr; Douglas W. Beattie, both of Willowdale, Canada, and James D. Easton, Louisville, Ky., assignors to Dominion Colour Company Ltd., Toronto, Canada**

**Filed Feb. 1, 1978, Ser. No. 874,335**
**Claims priority, application Canada, Dec. 19, 1977, 293330**
**Int. Cl.[2] C08J *3/00;* C08L *93/04;* C09C *3/10***
**U.S. Cl. 260—27 R** **13 Claims**

1. Process of preparing an aqueous pigmented composition having pigment particles substantially evenly dispersed therein, which comprises:

(a) mixing water insoluble pigment particles with an aqueous solution of an organic resin, said resin having an acid form in which it contains free carboxylic acid groups and is substantially insoluble in water, and a salt form produced by treating the acid form thereof with base, said salt form being substantially soluble in water, the resin being readily convertable between its water soluble and water insoluble forms, the acid number of said resin being in the range of 140 to about 300 and the number average molecular weight of said resin being less than 5000;

(b) acidifying the organic resin-pigment particle admixture so as to convert the organic resin to its insoluble form and cause precipitation of the resin from aqueous solution onto the pigment particles to form water insoluble resin-pigment complex particles, and separating said complex particles from the aqueous medium;

(c) treating the resin-pigment complex particles with a volatile base in a quantity sufficient to convert the resin to its water soluble form, and dispersing the solubilized resin-pigment particles, by agitation and without grinding or milling, in an aqueous, film forming resin containing coating formulation, the film forming resin contained in the coating formulation having a high degree of compatibility with the resin of said resin-pigment complex particles.

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**4,166,812**

## FILLED COMPOSITIONS OF A POLYPHENYLENE ETHER RESIN AND RUBBER-MODIFIED ALKENYL AROMATIC RESINS

**Gim F. Lee, Jr., Albany, N.Y., assignor to General Electric Company, Pittsfield, Mass.**

**Filed Sep. 30, 1977, Ser. No. 838,675**
**Int. Cl.[2] C08K *3/34;* C08L *23/00, 51/08, 53/02***
**U.S. Cl. 260—42.47** **30 Claims**

1. An improved thermoplastic molding composition which comprises:

(a) from about 1 to 99 parts by weight of a polyphenylene ether resin and

(b) from about 99 to 1 parts by weight of a rubber-modified alkenyl aromatic resin,

wherein the improvement comprises the molding composition containing about 50 or less parts by weight of aluminum silicate, based on (a) plus (b).

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**4,166,813**

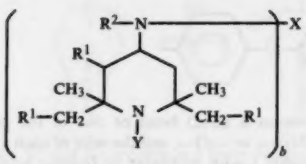
## POLYALKYLATED 4-AMINOPIPERIDINE DERIVATIVES

**Nobuo Soma; Syoji Morimura; Takao Yoshioka, and Tomoyuki Kurumada, all of Hiromachi, Japan, assignors to Sankyo Company Ltd., Tokyo, Japan**

**Filed May 8, 1978, Ser. No. 903,592**
**Claims priority, application Japan, May 18, 1977, 52/57271**
**Int. Cl.[2] C07D *401/12, 401/14;* C08K *5/34***
**U.S. Cl. 260—45.8 N** **16 Claims**

9. A polymeric composition stabilized against photo- and thermal deterioration comprising a synthetic polymer and a

stabilizing amount of stabilizer selected from the group consisting of compounds of formula (I):



(I)

wherein

$R^1$ represents a hydrogen atom or a methyl group;

$R^2$ represents a hydrogen atom, an alkyl group having from 1 to 18 carbon atoms, a cycloalkyl group having from 5 to 7 carbon atoms, an unsubstituted phenyl group, a phenyl group having one or more substituents selected from $C_1$–$C_4$ alkyl and $C_1$–$C_4$ alkoxy groups, a naphthyl group, an aralkyl group having 7 or 8 carbon atoms, an aliphatic, aromatic, araliphatic or alicyclic acyl group having up to 18 carbon atoms wherein the aryl moiety is unsubstituted or has one or more substituents selected from $C_1$–$C_4$ alkyl and hydroxy groups, an alkylsulphonyl group having from 1 to 4 carbon atoms, a phenylsulphonyl group which is unsubstituted or has one or more $C_1$–$C_{12}$ alkyl substituents, a group of formula —CONHR$^3$ wherein

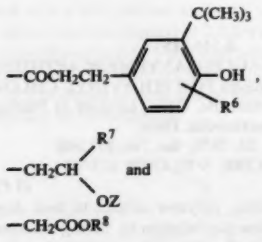
$R^3$ represents an alkyl group having from 1 to 18 carbon atoms, an unsubstituted phenyl group, a substituted phenyl group having one or more substituents selected from methyl groups, chlorine atoms and bromine atoms, a naphthyl group or a cycloalkyl group having from 5 to 7 carbon atoms,

or a group of formula —$CH_2CH_2OZ$;

when $R^2$ represents a hydrogen atom, Z of X and Y as defined herein below represents a hydrogen atom and when $R^2$ represents a group other than a hydrogen atom, Z represents a hydrogen atom, an alkyl group having from 1 to 18 carbon atoms, an allyl group, a benzyl group, an aliphatic, aromatic, araliphatic or alicyclic acyl group having up to 18 carbon atoms wherein the aryl moiety is unsubstituted or has one or more substituents selected from $C_1$–$C_4$ alkyl and hydroxy groups, or a group of formula —CONHR$^9$ wherein

$R^9$ represents an alkyl group having from 1 to 18 carbon atoms, an unsubstituted phenyl group, a phenyl group having one or more substituents selected from methyl groups, chlorine atoms and bromine atoms, a naphthyl or a cycloalkyl group having from 5 to 7 carbon atoms;

when $R^2$ represents a hydrogen atom, Y represents a hydrogen atom, an alkyl group having from 1 to 18 carbon atoms, an alkenyl group having 3 or 4 carbon atoms or a benzyl group, and, when $R^2$ represents a group other than a hydrogen atom, Y represents a hydrogen atom, an alkyl group having from 1 to 18 carbon atoms, an alkenyl group having 3 or 4 carbon atoms, a benzyl group, a 2,3-epoxypropyl group, an aliphatic acyl group having up to 18 carbon atoms or one of the groups of formulae



wherein

$R^6$ represents an alkyl group having from 1 to 4 carbon atoms;

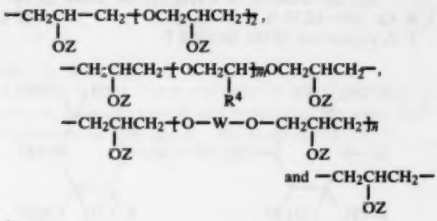
$R^7$ represents a hydrogen atom, a methyl group or a phenyl group;

$R^8$ represents an alkyl group having from 1 to 18 carbon atoms; and

Z is as defined above;

b represents 2 or 3; and

when b=2, X represents one of the groups of formulae



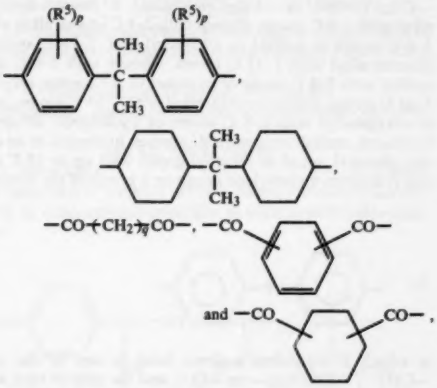
wherein

m represents an integer of from 1 to 10;

n represents an integer of from 1 to 10;

$R^4$ represents a hydrogen atom or a methyl group;

W represents one of the groups of formulae



wherein

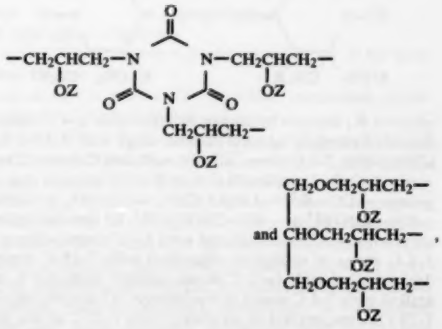
p represents 0, 1 or 2;

$R^5$ represents a halogen atom;

q represents an integer of from 1 to 10; and

Z is as defined above;

when b=3; X represents one of the groups of formulae



wherein Z is as defined above,

and acid addition salts thereof.

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**4,166,814**

## BIS-POLYALKYLPIPERIDINES

**Friedrich Karrer, Zofingen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**

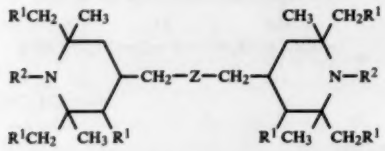
**Filed Oct. 11, 1977, Ser. No. 840,706**

**Claims priority, application Switzerland, Oct. 18, 1976, 13164/76**

**Int. Cl.**[2] **C08K** *5/34;* **C07D** *211/06;* **C09B** *23/00*

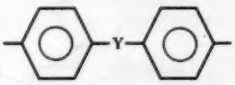
**U.S. Cl. 260—45.75 N** **15 Claims**

1. A compound of the formula I



I

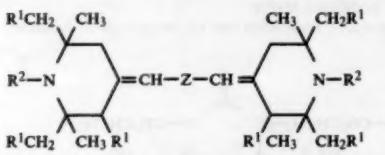
in which $R^1$ denotes hydrogen or alkyl with 1–4 C atoms, $R^2$ denotes hydrogen, an oxyl radical, alkyl with 1–12 C atoms, alkenyl with 3–6 C atoms, alkynyl with 3–6 C atoms, 2,3-epoxypropyl, aralkyl or alkaralkyl with 7–11 C atoms or one of the groups —CO—$R^3$, —$CH_2COOR^4$, —$COOR^4$, —$CONHR^5$, —$CH_2CONHR^5$ or —$CH_2CH(R^6)OR^7$, $R^3$ denotes hydrogen, alkyl with 1–6 C atoms, alkenyl with 2–4 C atoms, alkynyl with 2–4 C atoms or aralkyl or alkaralkyl with 7–15 C atoms, $R^4$ denotes alkyl with 1–12 C atoms, alkenyl with 3–6 C atoms, aralkyl with 7–8 C atoms or cyclohexyl, $R^5$ denotes alkyl with 1–18 C atoms, aralkyl or alkaralkyl with 7–15 C atoms, phenyl or alkylphenyl with 6–8 C atoms or cyclohexyl, $R^6$ denotes hydrogen, methyl or phenyl, $R^7$ denotes hydrogen or an alkanoyl, alkenoyl, aroyl or alkaroyl group with up to 18 C atoms and Z denotes a phenylene group or a group of the formula II



II

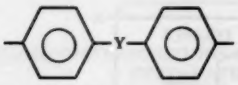
in which Y represents a direct bond or one of the groups —$CH_2$—, —$C(CH_3)_2$— or —O—, and the salts of such a compound of the formula I with inorganic or organic acids and complexes of a compound of the formula I with nickel compounds.

10. A compound of the formula VI



VI

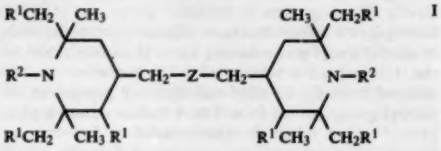
wherein $R_1$ denotes hydrogen or alkyl with 1–4 C atoms, $R_2$ denotes hydrogen, an oxyl radical, alkyl with 1–12 C atoms, alkenyl with 3–6 C atoms, alkynyl with 3–6 C atoms, 2,3-epoxypropyl, aralkyl or alkaralkyl with 7–11 C atoms or one of the groups —CO—$R^3$, —$CH_2COOR^4$, —$COOR^4$, —$CONHR^5$, —$CH_2CONHR^5$ or —$CH_2CH(R^6)OR^7$, $R^3$ denotes hydrogen, alkyl with 1–6 C atoms, alkenyl with 2–4 C atoms, alkynyl with 2–4 C atoms of aralkyl or alkaralkyl with 7–15 C atoms, $R^4$ denotes alkyl with 1–12 C atoms, alkenyl with 3–6 C atoms, aralkyl with 7–8 C atoms or cyclohexyl, $R^5$ denotes alkyl with 1–18 C atoms, aralkyl or alkaralkyl with 7–15 C atoms, phenyl or alkylphenyl with 6–8 C atoms of cyclohexyl, $R^6$ denotes hydrogen, methyl or phenyl, $R^7$ denotes hydrogen or an alkanoyl, aroyl or alkaroyl group with up to 18 C atoms and Z denotes a phenylene group or a group of the formula II



II

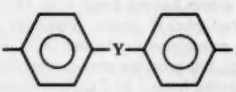
in which Y represents a direct bond or one of the groups —$CH_2$—, —$C(CH_3)_2$— or —O—, and the salts of such a compound of the formula I with inorganic or organic acids and complexes of a compound of the formula I with nickel compounds.

12. A plastic stabilised against degradation by light, which contains 0.01 to 5% by weight of a compound of the formula I



I

wherein $R_1$ denotes hydrogen or alkyl with 1–4 C atoms, $R_2$ denotes hydrogen, an oxyl radical, alkyl with 1–12 C atoms, alkenyl with 3–5 C atoms, alkynyl with 3–5 C atoms, 2,3-epoxypropyl, aralkyl or alkaralkyl with 7–11 C atoms or one of the groups —CO—$R^3$, —$CH_2COOR^4$, —$COOR^4$, —$CONHR^5$, —$CH_2CONHR^5$ or —$CH_2CH(R^5)OR^7$, $R^3$ denotes hydrogen, alkyl with 1–6 C atoms, alkenyl with 2–4 C atoms, alkynyl with 2–4 C atoms or aralkyl or alkaralkyl with 7–15 C atoms, $R^4$ denotes alkyl with 1–12 C atoms, alkenyl with 3–8 C atoms, aralkyl with 7–8 C atoms or cyclohexyl, $R^5$ denotes alkyl with 1–18 C atoms, aralkyl or alkaralkyl with 7–15 C atoms, phenyl or alkylphenyl with 6–8 C atoms or cyclohexyl, $R^6$ denotes hydrogen, methyl or phenyl, $R^7$ denotes hydrogen or an alkanoyl, aroyl or alkaroyl group with up to 18 C atoms and Z denotes a phenylene group or a group of the formula II



II

in which Y represents a direct bond or one of the groups —$CH_2$—, —$C(CH_3)_2$— or —O—, and the salts of such a compound of the formula I with inorganic or organic acids and complexes of a compound of the formula I with nickel compounds.

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**4,166,815**

## DIALKYLTIN BIS(3-SULFOLANYLMERCAPTIDES) AS THERMAL STABILIZERS FOR POLYVINYL CHLORIDE

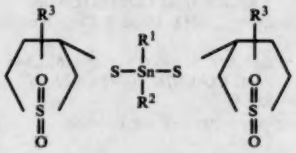
**Ralph P. Williams, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Jan. 23, 1978, Ser. No. 871,660**

**Int. Cl.**[2] **C08K** *5/58;* **C07D** *333/48*

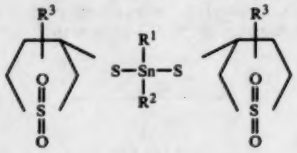
**U.S. Cl. 260—45.75 S** **11 Claims**

1. A halogen-containing polymer subject to heat degradation stabilized against heat degradation by having incorporated therewith a dialkyltin bis (3-sulfolanylmercaptide) represented by the formula:



wherein $R^1$ and $R^2$ are selected from the group consisting of linear or branched alkyl and cycloalkyl radicals, and mixtures of the two, containing from 1 to 18 carbon atoms inclusive, and $R^3$ can be hydrogen or an alkyl group having 1 to 4 carbon atoms.

**11.** A dialkyltin bis(3-sulfolanylmercaptide) represented by the formula:



wherein $R^1$ and $R^2$ are selected from the group consisting of linear or branched alkyl and cycloalkyl radicals, and mixtures of the two, containing from 1 to 18 carbon atoms, inclusive, and $R^3$ can be hydrogen or an alkyl group having 1 to 4 carbon atoms.

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**4,166,816**

## METHODS AND INTERMEDIATES FOR PREPARING CIS-4-OXOAZETIDINE INTERMEDIATES

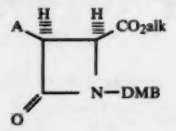
**John G. Gleason, Delran; Kenneth G. Holden, Haddonfield, both of N.J., and William F. Huffman, Malvern, Pa., assignors to SmithKline Corporation, Philadelphia, Pa.**

**Continuation-in-part of Ser. No. 696,094, Jun. 14, 1976, which is a continuation-in-part of Ser. No. 626,686, Oct. 29, 1975, abandoned, which is a continuation-in-part of Ser. No. 574,225, May 5, 1975, abandoned. This application Aug. 3, 1977, Ser. No. 821,386**

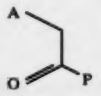
**Int. Cl.[2] C07D** *205/08, 403/04*

**U.S. Cl. 260—239 A** **13 Claims**

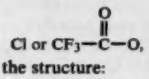
**1.** The method of preparing a compound of the structure:



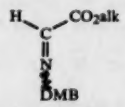
in which A is azido, blocked amino or acylamino; alk is lower alkyl, benzyl, methoxybenzyl or 2,2,2-trichloroethyl and DMB is 2,4-dimethoxybenzyl, 4-methoxybenzyl, benzhydryl or a benzhydryl having a methoxy substituent at one or more of the two o or p positions of both phenyl rings; comprising reacting a compound of the structure:



in which A is as defined above and P is Br,



with a compound of the structure:



in which alk and DMB are as defined above in an aprotic solvent which is inert under the reaction conditions and in which the reactants are soluble at a temperature selected from within the range of from about −80° C. to about +5° C.

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**4,166,817**

## PENICILLINS

**Harry Ferres, Epsom, and Frank P. Harrington, Tilgate, both of England, assignors to Beecham Group Limited, United Kingdom**

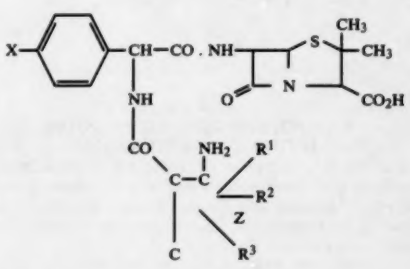
**Filed Mar. 13, 1978, Ser. No. 886,033**

**Claims priority, application United Kingdom, Mar. 16, 1977, 11234/77**

**Int. Cl.[2] C07D** *499/68*

**U.S. Cl. 260—239.1** **21 Claims**

**1.** A penicillin of formula (I) or a pharmaceutically acceptable salt or conventional penicillin in vivo hydrolysable ester thereof:



(I)

wherein

X is hydrogen or hydroxy;

the dotted line represents a double bond in one of the positions shown;

Z represents the residue of a pyridine, pyrimidine, pyridazine or 1,2,3-triazine ring;

$R^1$, $R^2$ and $R^3$ are the same or different and each represents hydrogen, halogen, $C_{1-6}$ alkyl, $C_{1-6}$ alkoxy, $C_{1-6}$ alkylthio, cyano, amino, mercapto, $C_{1-6}$ alkylamino, di-$C_{1-6}$ alkylamino, $C_{1-6}$ alkanoyl-amino, nitro or hydroxy or any two of $R^1$, $R^2$ and $R^3$ on adjacent carbon or nitrogen atoms represent the residue of a benzene, cyclohexane, cyclopentane, pyridine, pyrimidine, pyridazine, pyrazine, piperidine, piperazine, pyrrolidine, pyrazole, triazole, tetrazole, oxadole, triazine, thiazoline, thiazolidine or morpholine ring, and being optionally substituted with up to three substituents selected from halogen, $C_{1-6}$ alkoxy, $C_{1-6}$ alkythio or hydroxy.

## 4,166,818
## ACYLAMINO DERIVATIVES

William J. Ross, Lightwater; John P. Verge, Henley-on-Thames, and William R. N. Williamson, Slough, all of England, assignors to Lilly Industries Limited, London, England

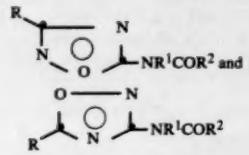
Continuation of Ser. No. 691,952, Jun. 1, 1976, abandoned. This application Oct. 11, 1977, Ser. No. 840,885

Claims priority, application United Kingdom, Jun. 5, 1975, 24224/75

Int. Cl.[2] C07D *271/06, 285/08*

U.S. Cl. 548—128 21 Claims

1. A compound selected from the group consisting of:



wherein R is $C_{1-4}$ hydroxyalkyl, $C_{1-4}$ alkyl, $C_{3-10}$ cycloalkyl, or optionally $R^3$-substituted phenyl and wherein $R^1$ is $C_{1-10}$ alkyl, $C_{2-6}$ alkenyl, $C_{2-6}$ *l alkenyl, C*2-6 alkynyl, $C_{2-6}$ alkoxyalkyl, $C_{2-6}$ carboxyalkyl, $C_{1-6}$ haloalkyl, $C_{3-10}$ cycloalkyl, $C_{3-10}$ cycloalkyl-$C_{1-6}$ alkyl, optionally $R^3$-substituted phenyl-$C_{1-6}$ alkyl, or optionally $R^3$-substituted phenyl-$C_{2-6}$ alkenyl; $R^2$ is $C_{1-8}$ alkyl, $C_{1-6}$ haloalkyl, $C_{2-6}$ alkenyl, $C_{3-10}$ cycloalkyl, $C_{3-10}$ cycloalkyl-$C_{1-6}$ alkyl, optionally $R^3$-substituted phenyl, optionally $R^3$-substituted phenyl-$C_{1-6}$ alkyl, or optionally $R^3$-substituted phenyl-$C_{2-6}$ alkenyl; and $R^3$ is halogen, trifluoromethyl, $C_{1-3}$ alkyl, $C_{1-3}$ Alkoxy or nitro; provided that: when R is phenyl and $R^2$ is methyl, $R^1$ cannot be methyl or benzyl; and when $R^1$ is $C_{2-6}$ alkynyl, the $-C{\equiv}C-$ group cannot be directly adjacent to the nitrogen atom of the acylamino group.

5. The compound which is N-(3-methyl-1,2,4-thiadiazol-5-yl)-N-methylphenyl acetamide.

6. The compound which is N-(3-methyl-1,2,4-thiadiazol-5-yl)-N-2-propenylcyclopropane carboxamide.

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## 4,166,819
## 4-AROYL SUBSTITUTED PHENOXY METHYLENE-5-TETRAZOLES

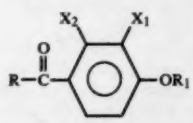
Peter H. Jones, Lake Forest, Ill.; Dilbagh S. Bariana, Montreal; Anthony K. L. Fung, Pierrefonds, both of Canada; Yvonne C. Martin, Waukegan, Ill.; Jaroslav Kyncl, Lake Bluff, Ill., and Amrit Lall, Libertyville, Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Division of Ser. No. 616,220, Sep. 24, 1975, Pat. No. 4,058,559. This application Sep. 6, 1977, Ser. No. 830,975

Int. Cl.[2] C07D *257/04*

U.S. Cl. 548—253 3 Claims

1. A compound of the formula



wherein R is a phenyl ring, a phenyl ring substituted with a substituent selected from the group consisting of loweralkyl of from 1 to 6 carbon atoms, halogen, loweralkoxy of from 1–6 carbon atoms, nitro and hydroxy, or naphthyl; $R_1$ is methylene-5-tetrazole; and $X_1$ and $X_2$ are each the same halogen or a loweralkyl of 1–6 carbon atoms, or when taken together form with the two attached carbons a phenyl ring.

## 4,166,820
## SELENIUM COMPOUNDS

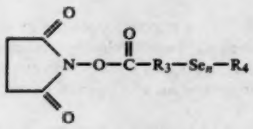
Julian E. Spallholz, 17441 Mashie Cir., Huntington Beach, Calif. 92647

Filed Aug. 4, 1977, Ser. No. 821,646

Int. Cl.[2] C07D *207/46, 421/12*

U.S. Cl. 260—326.4 19 Claims

1. Selenium compounds of the formula:



wherein:

$R_3$ is alkylene of 1 to 6 carbons;

$R_4$ is alkyl or isoalkyl of 1 to 6 carbons, phenyl or benzyl; or $R_3$ and $R_4$ together are 1, 2, 3-propanetriyl;

and n is 1 or 2.

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## 4,166,821
## PROCESS FOR PREPARING 1,4-DIOXAN-2-ONES

Shigeto Suzuki, San Francisco, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 821,685, Aug. 4, 1977, which is a division of Ser. No. 711,933, Aug. 5, 1976, Pat. No. 4,070,375. This application Jun. 29, 1978, Ser. No. 920,438

Int. Cl.[2] C07D *319/12*

U.S. Cl. 260—340.2 1 Claim

1. A process for preparing a 1,4-dioxan-2-one which comprises contacting a 1,3-dioxolane with carbon monoxide in the presence of a catalytic amount of anhydrous hydrogen fluoride.

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## 4,166,822
## BRANCHED-CHAIN ALKYL AMINO ANTHRAQUINONES

Walter Hohmann, Leverkusen, and Werner Kühnel, Leverkusen-Steinbüchel, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

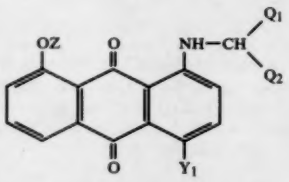
Division of Ser. No. 308,726, Nov. 22, 1972, abandoned. This application Jan. 26, 1977, Ser. No. 762,508

Claims priority, application Fed. Rep. of Germany, Nov. 22, 1971, 2157771

Int. Cl.[2] C07C *97/24, 97/2*

U.S. Cl. 260—380 3 Claims

1. Anthraquinone compound of the formula:



wherein

$Q_1$ is methyl;

$Q_2$ is methyl or ethyl;

$Y_1$ is bromo, isopropylamino, sec-butylamino, cyclohexylamino, or methylcyclohexylamino; and

Z is hydrogen or methyl.

## 4,166,823
## PROCESS FOR PURIFYING PHOSPHATIDES

Fritz G. Sietz, Zwijndrecht, Netherlands, assignor to Thomas J. Lipton, Inc., Englewood Cliffs, N.J.

Continuation-in-part of Ser. No. 716,101, Aug. 20, 1976, abandoned, which is a continuation of Ser. No. 559,231, Mar. 17, 1975, abandoned. This application Apr. 18, 1977, Ser. No. 788,238

Claims priority, application United Kingdom, Mar. 22, 1974, 12927/74

Int. Cl.[2] A23J *7/00*; C07F *9/02*; C11C *3/00*

U.S. Cl. 260—403 9 Claims

1. A process for obtaining transparent phosphatides from crude phosphatide sludge comprising (a) subjecting said sludge prior to alkali refining to the action of a combination of solvents consisting essentially of (i) a hydrophobic liquid solvent selected from the group consisting of aliphatic, cyclic and aromatic hydrocarbons in an amount of between about 200% and 2000% by volume and (ii) water in an amount of between about 5% and 150% by volume, both (i) and (ii) amounts being based on the volume of the phosphatide content of said sludge, (b) separating the hydrophibic liquid and the water, and (c) recovering the transparent phosphatide product from the hydrophobic liquid.

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## 4,166,824
## CHIRAL RHODIUM-DIPHOSPHINE CATALYST CAPABLE OF CATALYTIC REDUCTION OF A TETRAMISOLE PRECURSOR TO GIVE A SIGNIFICANT EXCESS OF THE DESIRED S-(−)ISOMER, LEVAMISOLE

William A. Henderson, Jr., Stamford, Conn., assignor to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 806,423, Jun. 14, 1977, abandoned. This application Apr. 14, 1978, Ser. No. 896,254

Int. Cl.[2] C07F *15/00*

U.S. Cl. 260—429 R 3 Claims

1. The compound trans-2,3-Bis(diphenylphosphinomethyl)-bicyclo[2.2.1]heptane and its chiral enantiomers.

2. A chiral catalyst prepared by reacting a chiral enantiomer of the compound described in claim 1 with $[Rh(COD)X]_2$, wherein X is Cl, Br or I.

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## 4,166,825
## CHROMOGENIC SUBSTRATES

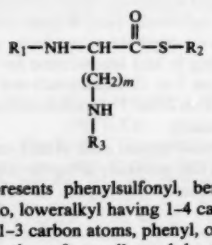
Jacob J. Plattner; Houston F. Voss, both of Libertyville, and Susan E. Magic, Lake Bluff, all of Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Filed Aug. 17, 1978, Ser. No. 934,298

Int. Cl.[2] C07C *153/09*

U.S. Cl. 260—455 R 9 Claims

1. The biologically compatible acid addition salts of a compound of the formula



wherein: $R_1$ represents phenylsulfonyl, benzoyl, carbobenzoxy, and the halo, loweralkyl having 1–4 carbon atoms, loweralkoxy having 1–3 carbon atoms, phenyl, or hydroxy substituted derivatives thereof; or alkanoyl having 2–12 carbon atoms; $R_2$ represents alkyl having 1–10 carbon atoms or alkoxyalkyl having 2–6 carbon atoms, cycloalkyl having 5–7 carbon atoms, or benzyl and the halo, lowerlakyl having 1–4 carbon atoms, loweralkoxy having 1–3 carbon atoms, carboxy, hydroxy or phenyl substituted derivatives thereof; $R_3$ represents hydrogen or guanyl; and m is 3 or 4.

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## 4,166,826
## PROCESS FOR THE PREPARATION OF 1-AMINO-8-NAPHTHOL-3,6-DISULPHONIC ACID (H-ACID)

Willi Schössler, Cologne; Rolf Pütter, Duesseldorf, and Horst Behre, Odenthal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jun. 28, 1978, Ser. No. 920,032

Claims priority, application Fed. Rep. of Germany, Jul. 16, 1977, 2732266

Int. Cl.[2] C07C *143/66*

U.S. Cl. 260—509 14 Claims

1. A process for the preparation of a mono-alkali metal salt of 1-amino-8-naphthol-3,6-disulphonic acid which comprises reacting 1-naphthylamine-3,6,8-trisulphonic acid and/or a salt thereof and/or a naphthylamine-trisulphonic acid isomer mixture and/or salt thereof with an alkali metal hydroxide solution in the presence of an aliphatic having from 1 to 6 carbon atoms and/or alcoholate thereof and in the presence of a substance which contains at least one oxygen atom bonded to a nitrogen atom, at elevated pressure and elevated temperature, and separating out the mono-alkali metal salt of 1-amino-8-naphthol-3,6-disulphonic acid by acidification.

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## 4,166,827
## BIS-CARBAMYLGUANIDINOAZAALKANE ANTIMICROBIAL COMPOUNDS

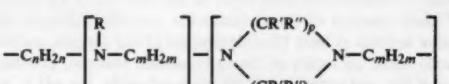
Julius Diamond, Mountain Lakes, N.J., assignor to Cooper Laboratories, Inc., Parsippany, N.J.

Continuation-in-part of Ser. No. 735,319, Oct. 26, 1976, Pat. No. 4,110,328, which is a continuation-in-part of Ser. No. 627,139, Oct. 30, 1975, abandoned. This application Jun. 22, 1978, Ser. No. 918,090

Int. Cl.[2] C07C *127/15, 127/19*; C07D *295/12*; A61K *31/17*

U.S. Cl. 260—553 R 15 Claims

1. A compound having the formula Z—B—Y—B—Z wherein Y is a nitrogen-containing alkylene group having the structural formula:



wherein

n=2–4
m=2–4
p=2,3
q=2–4
x=0–3
y=0–2

and x=0 when y≠0 and y=0 when x≠0, and R is hydrogen or $C_1$–$C_8$ hydrocarbon radical selected from the group consisting of alkyl, alkenyl, alkynyl, cycloalkyl, and aralkyl radicals; R′ and R″ are each hydrogen or $C_1$–$C_4$ alkyl and may be the same or different; B is a substituted guanidino group selected from the group consisting of carbamylguanidino and thiocarbamylguanidino, with the proviso that when p and q are both equal to 2, then B is not a carbamylguanidino in which the guanidino portion is attached to Y; and Z is selected from the group consisting of $C_1$–$C_{12}$ alkyl; di($C_1$–$C_{10}$)alkylamino-$C_{10}$–$C_2$ alkyl having a total carbon content of $C_4$–$C_{12}$; $C_3$–$C_{12}$ alkenyl; $C_3$–$C_{12}$ alkynyl, $C_3$–$C_{12}$ cycloalkyl, $C_4$–$C_{12}$ cycloalkylalkyl, $C_6$–$C_{12}$ cycloalkenyl, $C_7$–$C_{14}$ cycloalkenylalkyl, $C_8$–$C_{12}$ polycycloalkyl, $C_9$–$C_{14}$ polycycloalkylalkyl, $C_8$–$C_{12}$ polycycloalkenyl, $C_9$–$C_{14}$ polycycloalkenylalkyl, $C_1$–$C_{10}$-alkoxy-$C_{10}$–$C_2$ alkyl having a total carbon content of $C_3$–$C_{14}$; $C_1$–$C_{10}$ alkylthio-$C_{10}$–$C_2$ alkyl having a total carbon content of

$C_3$–$C_{14}$; phenoxy $C_2$–$C_6$ alkyl; phenylthio $C_2$–$C_6$ alkyl; $C_6$–$C_{14}$ aryl; $C_7$–$C_{14}$ aralkyl and arylcycloalkyl; $C_9$–$C_{12}$ benzocycloalkyl, and $C_6$–$C_{14}$ aryl and aralkyl substituted with one or more radicals selected from the group consisting of lower alkyl, trifluoromethyl, loweralkoxy, trifluoromethoxy, phenoxy, loweralkylthio, halo, nitro, cyano, $C_2$–$C_6$ alkanoyl, benzoyl, loweralkoxycarbonyl, diloweralkylamino, loweralkylsulfonyl, fluorosulfonyl and loweralkylsulfinyl; and pharmacologically acceptable addition salts of these compound with acids.

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**4,166,828**

## PREPARATION OF N-(AMINOMETHYL)-α,β-ETHYLENICALLY UNSATURATED CARBOXAMIDES AND THEIR POLYMERS

**Charles J. McDonald, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.**

**Filed Dec. 2, 1977, Ser. No. 856,704**
**Int. Cl.² C07C *102/00***
**U.S. Cl. 260—561 N** **6 Claims**

1. A process for preparing a cationic N-(aminomethyl)-α,β-ethylenically unsaturated carboxamide which comprises contacting a reaction mixture comprising an α, β-ethylenically unsaturated carboxamide reactant with an aldehyde having 1 to 3 carbons and an amine represented by the structural formula:

$$HN(R_3)_2$$

wherein each $R_3$ is independently hydrocarbyl or both of $R_3$ are collectively a divalent hydrocarbon radical which combines with N of the amine to form a heterocyclic ring represented by the formula:

under conditions including a pH of less than about 7 sufficient to cause reaction of the carboxamide reactant, aldehyde and amine to form at least 10 mole percent of the cationic carboxamide based on moles of the carboxamide reactant, provided that if the carboxamide reactant is acrylamide, the pH is less than 5.

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**4,166,829**

## LINEAR DIENE POLYMER HAVING REACTIVE TERMINAL GROUPS AND METHOD OF PREPARING THE SAME

**Wolfgang Mehnert, Blumenstr. 13, Gundelfingen, Fed. Rep. of Germany (D-7803)**

**Filed Oct. 3, 1977, Ser. No. 838,711**
**Claims priority, application Fed. Rep. of Germany, Oct. 9, 1976, 2645650**
**Int. Cl.² C07C *47/26***
**U.S. Cl. 260—602** **9 Claims**

1. A compound of the formula

$$OCH—(CH_2)_2—R_n—(CH_2)_3—OH$$

wherein R is a radical of the formula $C_4H_{6-m}X_m$ having a straight chain of four carbon atoms,
X is hydrogen, methyl, or chlorine.
m is 1 or 2 when X is methyl or hydrogen,
m is 1 when X is chlorine, and
n is a number between 1 and 60.

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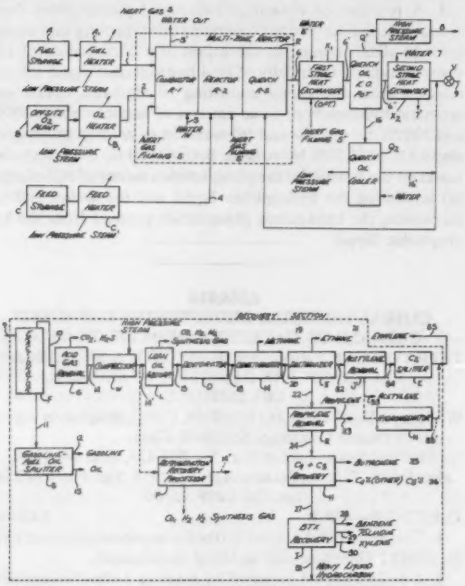
**4,166,830**

## DIACRITIC CRACKING OF HYDROCARBON FEEDS FOR SELECTIVE PRODUCTION OF ETHYLENE AND SYNTHESIS GAS

**Eugene D. Guth, 18711 Valley Dr., Villa Park, Calif. 92667; LeGrand A. Daly, 6616 Via Siena, and John K. Arand, 5731 Mistridge Dr., both of Rancho Palos Verdes, Calif. 90274**

**Filed Jun. 21, 1978, Ser. No. 917,462**
**Int. Cl.² C07C *3/08***
**U.S. Cl. 252—373** **56 Claims**



1. A method for the diacritic cracking of hydrocarbon feedstocks to obtain high yields of ethylene at a pressure in the range of about 70 psia to 1,000 psia comprising the steps of:
(a) feeding into a first zone of a reactor a hydrocarbon containing fuel stream and combusting said fuel in the presence of oxygen to form gaseous combustion products having a temperature sufficient to crack a preselected hydrocarbon feedstock;
(b) passing said combustion products into a second zone of said reactor in which sad preselected hydrocarbon feedstock is injected into said combustion products causing said hydrocarbon feed stock to react and be diacritically cracked so as to selectively form a gaseous product stream comprising a substantial yield of gaseous ethylene, synthesis gas, and said combustion products, said hydrocarbon feedstock being in said second zone for a residence time period of about 3 to 10 milliseconds and at a temperature of about 2400° to 2500° F. to allow said selective diacritic cracking to occur;
(c) passing into said second zone of said reactor an inert gas to form a gas film primarily along the wall surfaces of said reactor to minimize the deposit of coke in said second zone, said coke having been formed by the combustion of the hydrocarbon fuel in said first zone and by the cracking of the hydrocarbon feedstock in said second zone; and
(d) cooling said gaseous product stream from said second zone in a third zone of said reactor to terminate further cracking and reactions, thereby optimizing the yield of ethylene.

4,166,831

## TRANSPARENT YTTRIA CERAMICS AND METHOD FOR PRODUCING SAME

William H. Rhodes, Lexington, and F. Joseph Reid, Acton, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Division of Ser. No. 814,342, Jul. 11, 1977, Pat. No. 4,098,612.
This application Mar. 9, 1978, Ser. No. 884,942
Int. Cl.[2] C04B *35/50*
U.S. Cl. 264—1 16 Claims

1. A process for preparing a substantially transparent, high density polycrystalline yttria-based body comprising the steps of:

admixing alumina or a precursor thereof convertible by sintering to alumina, with yttria or a precursor thereof convertible by sintering to yttria to form a mixture, the alumina or precursor thereof being present in the mixture in an amount to provide between about 0.01 and 5 wt. % alumina upon subsequent sintering;

drying the resulting powder;

calcining the dried powder at 1000° C. in air;

pressing the calcined powder into a given shape; and sintering the shaped powder for about ½ to six hours above the eutectic temperature in an atmosphere sufficiently low in oxygen to prevent oxidative contamination.

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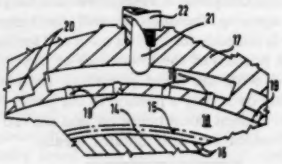
4,166,832

## PROCESS FOR THE INJECTION MOLDING OF MOTOR VEHICLE TIRE TREADS

Achille Gallizia, Milan, Italy, assignor to Industrie Pirelli, S.p.A., Milan, Italy

Filed Dec. 14, 1977, Ser. No. 860,304
Claims priority, application Italy, Dec. 30, 1976, 30985 A/76
Int. Cl.[2] B29D *3/02;* B29H *3/08*
U.S. Cl. 264—279 10 Claims



1. A process for the injection molding of treads on a tire carcass which comprises feeding an elastomeric composition for molding the tire's tread to a plurality of equalization spaces symmetrically arranged with respect to the injection cavity of the mold where the tread is formed, said mix moving to the said injection cavity from each of the said spaces through a plurality of injection passages, said mix being fed to each of the above spaces through at least one feeding passage, the ratio between average sliding gradients $\gamma_i$ of the said injection passages and gradients $\gamma_a$ of the said feeding passages being not lower than 8.

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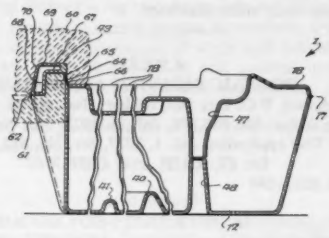
4,166,833

## METHOD AND APPARATUS FOR MOLDING A PLASTIC ARTICLE

Peter T. Schurman, Woodbridge, Conn., assignor to The Plastic Forming Company, Inc., Woodbridge, Conn.

Division of Ser. No. 408,305, Oct. 23, 1973, Pat. No. 3,933,243.
This application May 29, 1975, Ser. No. 581,844
Int. Cl.[2] B29C *17/07, 17/10, 17/14*
U.S. Cl. 264—540 6 Claims

1. Blow molding apparatus for forming a thermoplastic article intended to have an opening through a wall portion thereof which comprises mold sections adapted to be moved into engagement about thermoplastic material, said mold sections when engaged forming a cavity having the shape of said article, means for delivering thermoplastic material between said mold sections, means for expanding said material within said cavity to form said article, said mold sections having coacting portions movable in predetermined substantially parallel, opposite directions one past the other and in close proximity to one another so as to shear a portion of said material in the area intended to have said opening whereby said area lies in a plane substantially parallel to said direction of movement of said mold sections.



4. The method of molding an article intended to have an opening through a wall thereof which comprises delivering thermoplastic material between mold sections adapted when engaged to form a cavity having the shape of the article, engaging the mold sections in predetermined substantially parallel, opposite directions one past the other and in close proximity to one another, and expanding the material in the cavity to form the article so as to shear a portion of the material within the cavity during the mold cycle in the area intended to have the opening whereby said area lies in a plane substantially parallel to said direction of movement of said mold sections.

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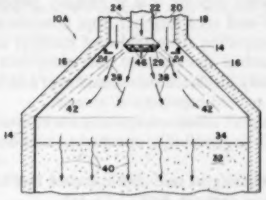
4,166,834

## AIR INJECTOR NOZZLE FOR SECONDARY REFORMER

Robert D. Reed, and Richard R. Martin, both of Tulsa, Okla., assignors to John Zink Company, Tulsa, Okla.

Filed Sep. 27, 1977, Ser. No. 836,968
Int. Cl.[2] B01J *8/02;* B05B *1/14;* C01C *1/04*
U.S. Cl. 422—148 4 Claims



1. In a secondary reformer in a HABER-type ammonia synthesizer, comprising a cylindrical pressure reactor having a tapered top contour terminating in a vertical axial inlet conduit, said inlet conduit having an axial air pipe, supporting an air plenum closed at its bottom end, and including means to flow the process gases downwardly in the annular space between said inlet conduit and said air pipe; the improvement in an air jet head for said air plenum, comprising:

(a) a plurality of air jet pipes inserted and sealed through the wall of said air plenum, arranged symmetrically circumferentially, in equal number, in each of two rows, spaced a selected vertical distance apart axially of said plenum, whereby the stream of air issuing from each of said air jet pipes is independent to prevent collapse of the low pressure area of any other stream of air from any other of said pipes, each air jet pipe in a radial plane at a selected angle A to the axis of said plenum, the planes of said air jet pipes

in one row bisecting the angles between pairs of pipes in the other row;

(b) a conical metal covering for said jet pipes having the same angle A to the axis of said pipe;

(c) the space around said air jet pipes beneath said covering filled with selected refractory out to the ends of said jet pipes; and wherein

(d) the length of said air jet pipes in the upper row is greater than the length of said air jet pipes in the lower row and wherein the length of all of said pipes is equal to at least twice their inside diameter.

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**4,166,835**

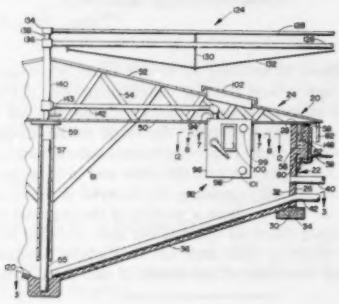
## ORGANIC DIGESTER APPARATUS

**Jay Anderson, P.O. Box 585, Elkhart, Ind. 46514**

**Division of Ser. No. 595,176, Jul. 11, 1975, Pat. No. 4,046,551. This application Jul. 1, 1977, Ser. No. 812,145**

**Int. Cl.[2] C12B *1/00*; C05F *9/02***

**U.S. Cl. 422—184** **4 Claims**



1. An organic digester of the type having a digester tank which includes an upright cylindrical member with top and bottom ends and that includes a bottom member for sealing the bottom end of the cylindrical member, and having a circular and removable roof member, the improvement which comprises:

an observation capsule that is radially displaced from the center of said roof member, that comprises capsule wall means depending from said roof member and being sealingly attached thereto, and that comprises a floor being horizontally displaced below said roof and being sealingly attached to said capsule wall means;

observation port means comprising a window being inserted into and being sealingly attached to said observation capsule;

an access opening in said roof member that opens into said observation capsule; and

means for rotating said roof member.

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**4,166,836**

## RENDERING APPARATUS

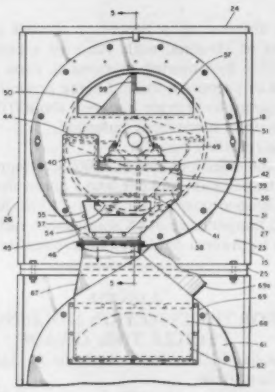
**John H. Pikel, Oak Lawn, Ill., assignor to Allegheny Ludlum Industries, Inc., Pittsburgh, Pa.**

**Continuation of Ser. No. 720,407, Sep. 3, 1976, abandoned. This application Oct. 25, 1977, Ser. No. 845,438**

**Int. Cl.[2] B01D *43/00*; C11B *1/16***

**U.S. Cl. 422—308** **8 Claims**

1. A continuous rendering apparatus of the type comprising: a plurality of generally horizontal cylinders having opposed end walls and arranged one above the other, connection means intercoupling the discharge end of each cylinder and the entry end of the cylinder therebeneath, the discharge end of each cylinder being adjacent the entry end of the cylinder therebeneath, whereby the material to be rendered passes sequentially and downwardly through said cylinders, heating means for heating each cylinder, elongated agitator means rotatably positioned in each cylinder for moving the material about the inner circumference of each cylinder, vent means from each cylinder for venting the vaporized moisture, vacuum means connected to each of said vent means for creating a vacuum in each of said cylinders, and seal means connected to a discharge pipe of the lowest cylinder for preserving the vacuum in said cylinders, wherein the improvement comprises: said connection means including a discharge opening in the exit end wall of each cylinder, an inlet opening in the entry end wall of the



cylinder therebeneath, and a discharge chute for each discharge opening, each chute extending beyond the ends of said cylinders and intercoupling a respective discharge opening with the inlet opening therebelow; said discharge opening being generally L-shaped and having a curved surface extending only along a portion of the lower half of the cylinder and generaly aligned with the inner periphery thereof and said opening extending over only a portion of the lower half of said cylinder with its highest point being on said curved surface in the direction of rotation of said agitator means.

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**4,166,837**

## SOLVENT-EXTRACTION PROCESS FOR RECOVERY AND SEPARATION OF METAL VALUES

**Lawrence V. Gallacher, East Norwalk, and Rachelle M. Rydzik, Easton, both of Conn., assignors to King Industries, Inc., Norwalk, Conn.**

**Filed Mar. 31, 1978, Ser. No. 892,327**

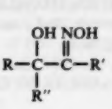
**Int. Cl.[2] C01G *3/00, 9/00, 51/00, 53/00***

**U.S. Cl. 423—24** **19 Claims**

1. A process for recovering a first cationic metal value from an aqueous solution comprising a pair of said first cationic metal value and a second cationic metal value, said pair being selected from the group consisting of copper (II) and iron, cobalt (II) and nickel, copper (II) and cobalt (II), cobalt (II) and zinc, nickel and zinc, zinc and iron, nickel and iron, copper (II) and nickel, copper (II) and iron, and copper (II) and zinc, said process comprising contacting said aqueous solution at a pH of below 3.5 with a solvent extractant consisting of (i) an alkyl aromatic sulfonic acid having a molecular weight of at least about 400, (ii) a fuzed ring aromatic N-alkyl triazole and (iii) a water-immiscible solvent for (i) and (ii) and metal complexes thereof to provide a solution of said metal-value in said solvent-extractant, the mole % of (ii) in the combined (i) and (ii) being in the range of 10 to 95; separating the solution thus formed from the aqueous raffinate depleted in said first metal value; and recovering said first metal value from said separated solution.

9. A process as defined in claim 1 wherein said solvent-

extractant also includes (iv) an aliphatic α-hydroxy oxime of the formula



wherein R and R′ are aliphatic hydrocarbon radicals and R″ is hydrogen or an aliphatic hydrocarbon radical, the mole % of (i) in the combined (i) and (iv) being in the range of 10 to 95, and the mole % of (ii) in the combined (i), (ii) and (iv) being in the range of 10 to 95.

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**4,166,838**

## PROCESS FOR TREATING EXHAUST GASES

**Atsushi Tatani; Kenichi Yoneda, both of Hiroshima; Yasuyuki Inoue, Musashino, and Masumi Atsukawa, Hiroshima, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 7, 1976, Ser. No. 730,178**

**Claims priority, application Japan, Oct. 28, 1975, 50/128847**

**Int. Cl.[2] C01B** *17/00*

**U.S. Cl. 423—242** **2 Claims**

1. In a process for exhaust gas desulfurization by the wet lime-gypsum process wherein a part of the sulfur values in the exhaust gas have previously been converted to ammonium sulfate, said process including the following steps:

(a) an absorbent preparation step to prepare a calcium hydroxide—magnesium hydroxide absorbent slurry from quicklime;

(b) an absorption step for scrubbing the exhaust gas with the absorbent slurry of step (a);

(c) an oxidizing step for oxidizing a slurry composed chiefly of calcium sulfite from the absorption step; and

(d) a solids-liquid separation step for separating a slurry composed mainly of gypsum from the oxidizing step, the improvement comprising,

(e) passing the liquid from said solids-liquid separation step (d) into a sulfate impurity reaction step where magnesium sulfate and ammonium sulfate in said liquid are reacted with calcium hydroxide added in an amount which is substantially equivalent to the combined amount of said magnesium and ammonium sulfates, and the liquid is thereby freed from said magnesium and ammonium sulfates, thus forming a purified liquid; and (f) the so purified liquid is supplied to the absorbent preparation step (a) when it is mixed with additional quicklime to form additional quantities of said absorbent slurry.

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**4,166,839**

## METHOD FOR PRODUCING CALCIUM PHOSPHATES

**Oyvind Skauli, and Jan B. Isaksen, both of Porsgrunn, Norway, assignors to Norsk Hydro A.S, Oslo, Norway**

**Continuation-in-part of Ser. No. 560,086, Mar. 19, 1975, abandoned. This application Jul. 18, 1977, Ser. No. 816,869**

**Claims priority, application Norway, Mar. 19, 1974, 740984**

**Int. Cl.[2] C01B** *15/16, 25/26*

**U.S. Cl. 423—311** **15 Claims**

1. A method of producing animal feed grade phosphates as mono-calcium phosphate, di-calcium phosphate or mixtures thereof, said method comprising:

providing an aqueous calcium carbonate suspension, preheated to a temperature of from 50° to 120° C., in which the calcium carbonate has an average grain size of $3 < 50\mu$, and having a concentration of 45–65% by weight $CaCO_3$;

providing a pure, relatively concentrated phosphoric acid solution containing from 74 to 88 wt. % of $H_3PO_4$ and preheated to a temperature of from 100° to 150° C.;

introducing said preheated calcium carbonate suspension and said preheated phosphorice acid solution, in suitable relative quantities to achieve a desired calcium phosphate reaction product, into a short tubular reaction zone having a closed first end and an open second end, and intensively mixing said calcium carbonate suspension and said phosphoric acid solution within said reaction zone to thereby react said calcium carbonate suspension and said phosphoric acid solution to generate gas and a desired calcium phosphate reaction produce in foam form;

ejecting by means of said gas formed in said reaction zone and prior to completion of the reaction the foamed reaction product in the form of a stream from said open second end of said reaction zone into a gaseous atmosphere, and thereby disintegrating said stream into individual particles freely suspended in said gaseous atmosphere, the reaction being substantially completed while said individual particles are freely suspended in said gaseous atmosphere, thereby forming moist but free-flowing calcium phosphate granules; and

collecting said granules without any further quenching treatment thereof.

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**4,166,840**

## PROCESS FOR PRODUCING AMMONIUM PHOSPHATE FROM AMMONIA AND WET PROCESS PHOSPHORIC ACID

**John D. Chapman, Felixstowe, England, assignor to Fisons Limited, London, England**

**Filed Nov. 30, 1976, Ser. No. 746,148**

**Claims priority, application United Kingdom, Dec. 24, 1975, 52765/75; Oct. 16, 1976, 43053/76**

**Int. Cl.[2] C01B** *15/16, 25/26*

**U.S. Cl. 423—313** **12 Claims**

1. A process for reacting ammonia and wet process phosphoric acid to produce ammonium phosphates, which process comprises feeding the reagents to a vessel comprising two tubular members in fluid flow communication with one another and a gas disengagement vessel, at least one of said tubular members being generally upright, the ammonia being fed to the basal portion of the upright member, the phosphoric acid being fed to the other tubular member; allowing the resultant reaction mixture to circulate spontaneously up the upright member, through the gas disengagement vessel and through the other member to the upright member; and recovering the ammonium phosphate reaction products from the reaction system by discharging the reaction mixture into a zone at ambient pressure and temperature whereby the reaction mixture loses water and is converted into a solid product.

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**4,166,841**

## METHOD FOR MAKING PURE BETA SILICON CARBIDE

**Jack E. Noakes, Plymouth, and Leslie L. Terner, West Bloomfield, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.**

**Filed May 3, 1978, Ser. No. 902,306**

**Int. Cl.[2] C01B** *31/36*

**U.S. Cl. 423—345** **4 Claims**

1. A method of making beta silicon carbide which comprises the steps of:

pyrolyzing in an inert atmosphere only microballoon structures formed of an organic material which is heat decomposable into carbon and volatile organic matter, said microballoon structures having a diameter in the range from 5 to 130 microns and a wall thickness in the range from 0.1 to 0.5 microns, said pyrolyzation causing said organic material to give off its volatile organic matter and form carbon with the microballoon structure remaining intact;

mixing only the pyrolyzed microballoon structures with finely divided silicon particles;

placing the mixture of pyrolyzed microballoon structures and finely divided silicon particles in an enclosed chamber;

drawing a vacuum on said enclosed chamber to remove oxygen from the enclosed chamber;

heating the enclosed chamber to a temperature in the range of 875° to 925° C. thereby to volatilize low melting impurities contained in the silicon particles and the enclosed chamber so that such impurities are removed from the enclosed chamber by operation of the vacuum;

establishing a partial pressure of nitrogen in the enclosed chamber, the nitrogen reacting with the silicon particles to form a skin of silicon nitride on the silicon particles;

heating the enclosed chamber to a temperature in the range of 1540° to 1590° C.;

re-establishing a vacuum within the enclosed chamber whereby the silicon nitride skin is removed from the silicon particles thereby permitting the silicon particles to vaporize into the enclosed chamber and to contact and react with the carbon microballoon structures to form beta silicon carbide in microballoon structures;

cooling the beta silicon carbide microballoon structures back to room temperature; and

crushing the microballoon structures to form finely divided beta silicon carbide having a size equivalent to the wall thickness of the microballoons prior to crushing.

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**4,166,842**

## HYDROXYLAMINE PURIFICATION VIA LIQUID/LIQUID EXTRACTION

**Allen A. Tunick, Boonton; Fred W. Koff, Long Valley, and Stylianos Sifniades, Madison, all of N.J., assignors to Allied Chemical Corporation, Morris Township, Morris County, N.J.**

**Filed Oct. 28, 1977, Ser. No. 846,657**
**Int. Cl.[2] C01B *21/20***
**U.S. Cl. 423—387** **16 Claims**

1. A process for selectively extracting hydroxylammonium ions from aqueous solutions containing hydroxylammonium salts in mixture with ammonium salt or ammonium and sodium salts comprising the following steps:

contacting said solutions with an extraction medium comprising an organic solution containing a cation exchange compound of structure $R_1COOX$ or $(R_2O)(R_3O)POOX$ or $(R_2O)(PO)(OX_2)$ or mixtures thereof wherein $R_1$ is an alkyl or alkenyl group from twelve to twenty carbon atoms, $R_2$ and $R_3$ are alkyl groups of from six to eighteen carbon atoms and X is H, Na, or $NH_4$, thereby removing from the solution some or all of the hydroxylammonium ions by selective extraction and wherein the aqueous phase after extraction has a pH of between about five and eight; and

contacting the extraction medium with an aqueous acid thereby removing hydroxylammonium ion.

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**4,166,843**

## HIGH YIELD SOLID PROPELLANT HYDROGEN GENERATORS

**Joseph E. Flanagan, Woodland Hills, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.**

**Filed Feb. 27, 1978, Ser. No. 881,491**
**Int. Cl.[2] C01B *1/16***
**U.S. Cl. 423—648 R** **1 Claim**

1. A method of generating pure gaseous hydrogen from a solid propellant, comprising the steps of:

forming said solid propellant by adding a complexing agent selected from the group consisting of silicon and aluminum to a borane compound selected from the group consisting of $(CH_3)H_3NB_3H_8$, $(CH_3)_2H_2NB_3H_8$, $(CH_3)_3HNB_3H_8$, and $(CH_3)_4NB_3H_8$; and

combusting said solid propellant so as to complex the available carbon molecules with said complexing agents and to generate pure gaseous hydrogen.

**4,166,844**

## SOLID PHASE SEPARATION TECHNIQUE FOR USE IN RADIOIMMUNOASSAYS

**Jan-I Tu, North Brunswick, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.**

**Filed Apr. 18, 1977, Ser. No. 788,477**
**Int. Cl.[2] A61K *43/00*; G01N *33/16***
**U.S. Cl. 424—1** **4 Claims**

1. A double antibody-coated test tube comprising a test tube capable of binding a layer of antibodies, having bound to at least a portion of its internal surface a layer of nonspecific antibodies and having bound to the layer of nonspecific antibodies a layer or specific antibodies, wherein the layer of specific antibodies is chemically linked to the layer of nonspecific antibodies.

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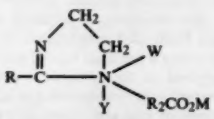
**4,166,845**

## ANTIDANDRUFF SHAMPOO COMPOSITIONS CONTAINING AN AMINOPOLYUREYLENE RESIN

**Kenneth R. Hansen, Staten Island, N.Y., and Paul S. Grand, South Bound Brook, N.J., assignors to Colgate-Palmolive Company, New York, N.Y.**

**Continuation of Ser. No. 90,155, Nov. 16, 1970, abandoned. This application May 9, 1977, Ser. No. 795,358**
**The portion of the term of this patent subsequent to Nov. 19, 1991, has been disclaimed.**
**Int. Cl.[2] A61K *31/785***
**U.S. Cl. 424—78** **10 Claims**

1. A high-foaming, antidandruff shampoo having cosmetic conditioning properties consisting essentially of about 14% to 25% by weight of a water-soluble betaine detergent having the formula $Z(N)R_1R_2CH_2CO_2$ wherein Z is a radical selected from the group consisting of $C_{10}$–$C_{16}$ alkyl, $C_{10}$–$C_{16}$ alkyl amidoethyl, and $C_{10}$–$C_{16}$ alkyl amidopropyl, and $R_1$ and $R_2$ are selected from the group consisting of $C_1$–$C_3$ alkyl and $C_1$–$C_3$ hydroxyalkyl; 1% to 6% by weight of a water-soluble supplementary detergent selected from the group consisting of alkyl sulfate, $R(OC_2H_4)_mOSO_3M$, trialkyl amine oxide, $R(R_1)_2N\rightarrow O$, acyl sarcosinate $RC(0)N(CH_3)CH_2CO_2M$, alkyl beta-aminopropionate, $RN(H)C_2H_4CO_2M$, alkyl beta-iminodipropionate, $RN(C_2H_4CO_2M)_2$, imidazole derivative,



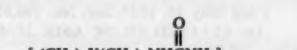
and 2-hydroxyalkyl detergent, $R_4X$, wherein R is an alkyl group of 10 to 18 carbon atoms, m is 0–5, $R_1$ is selected from the group consisting of $C_1$–$C_3$ alkyl and $C_1$–$C_3$ hydroxyalkyl, W is selected from the group consisting of $R_2OH$, $R_2CO_2M$, and $R_2OR_2CO_2M$, $R_2$ is an alkylene group or hydroxyalkylene group of 1 to 4 carbons, Y is selected from the group consisting of $OH^-$ and $R_3OSO_3$ and $R_3$ is selected from the group consisting of alkyl, alkyl aryl and fatty acyl glyceride groups having 6 to 18 carbons in the alkyl or acyl group, $R_4$ is a 2-hydroxy-alkyl group containing 10 to 18 carbons, X is selected from the group consisting of

$N(CH_3)CH_2CH_2SO_3M$, $N(CH_3)CH_2CO_2M$, $N(CH_3)CH_2CH_2SO_3M$,

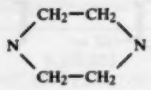
O O

$N(CH_3)CH_2CO_2M$, and $N(CH_2CH_2OH)_2$, and M is a cation selected from the group consisting of sodium, potassium, ammonium, and mono-, di-, and triethanolammonium; 2% to 8% by weight of a water-soluble nonionic detergent selected from the group consisting of a block copolymer of ethylene oxide and propylene oxide on propylene glycol wherein ethylene

oxide is 10% to 80% by weight and the molecular weight of the hydrophobe is about 1,200 to 3,500 and a condensate of a heteric mixture of oxypropylene and oxyethylene in a ratio of 3:1 to 1:3 on a $C_1$–$C_8$ alkanol, said condensate having a molecular weight in the range of 600 to 4,000 and mixtures thereof; 1% to 3% of an aminopolyureylene resin having a molecular weight in the range of 300 to 100,000 and characterized by the following repeating unit



where X is NH, N-$C_1$-$C_{22}$ alkyl, or



and n is 2 or 3; and water.

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**4,166,846**

## CHEMICALS FOR CONTROLLING PLANT VIRUS DISEASES AND CONTROL METHOD

**Taichiro Shigematsu, Machida; Hiroshi Kasugai, Hino; Tetsuya Shibahara, Miho; Tetsuo Nakajima, Kawasaki, and Toru Teraoka, Yokohama, all of Japan, assignors to Mitsubishi Chemical Industries, Ltd., Tokyo, Japan**

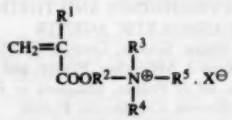
**Filed Jul. 12, 1978, Ser. No. 923,991**

**Claims priority, application Japan, Aug. 16, 1977, 52-98044; May 4, 1978, 53-53424**

**Int. Cl.[2] A01N** *9/00*

**U.S. Cl. 424—81** **18 Claims**

1. A method for controlling viral diseases in plants comprising applying to the plants an effective amount of (A) a homopolymer of a compound expressed by the general formula



(I)

wherein $R^1$ represents a hydrogen atom or a methyl group, $R^2$ represents a linear or a branched alkylene group containing from 2 to 5 carbon atoms, $R^3$ and $R^4$ independently represent a lower alkyl group, $R^5$ represents a hydrogen atom or a lower alkyl group, and X represents a halogen atom, a nitric acid radical, sulfuric acid radical, lower fatty acid radical or a lower alkylsulfuric acid radical or (B) a copolymer of the compound expressed by the above formula (I) and at least one ethylenically unsaturated monomer copolymerizable with said compound.

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**4,166,847**

## ANTI-NICOTINE AGENT PREPARED FROM A SACCHARIDE AND ROSIN OR TURPENTINE

**Hisashi Mitsui, Yokohama, Japan, assignor to Miya Ozawa, Yokohama, Japan**

**Filed Mar. 2, 1977, Ser. No. 773,482**

**Claims priority, application Japan, Mar. 22, 1976, 51-30992**

**Int. Cl.[2] A61K** *31/70;* **C07H** *3/02*

**U.S. Cl. 424—180** **4 Claims**

1. An anti-nicotine agent prepared by the steps of:

mixing (a) 45 to 450 parts by weight of a monosaccharide or disaccharide and (b) 1 to 10 parts by weight of acetic acid or glacial acetic acid, and heating the resultant mixture to produce a viscous material;

mixing (c) 30 to 300 parts by weight of rosin or turpentine and (d) 1.68 to 16.8 parts by weight of ammonia in the form of an aqueous solution, and heating the resultant mixture to produce a jelly-like material; and

mixing said viscous material and said jelly-like material, and heating the resultant mixture to remove substantially all water.

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**4,166,848**

## ANTHRACYCLINE DERIVATIVES, THEIR PREPARATION AND USE

**Luigi Bernardi; Paolo Masi; Antonino Suarato, all of Milan, and Federico Arcamone, Nerviano, all of Italy, assignors to Societa Farmaceutici Italia S.p.A., Milan, Italy**

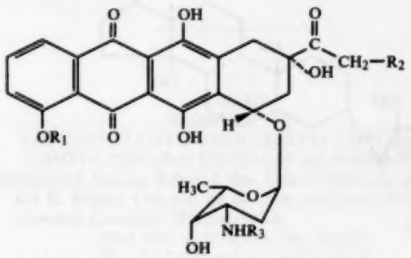
**Filed Nov. 14, 1977, Ser. No. 850,933**

**Claims priority, application United Kingdom, Nov. 16, 1976, 47601/76**

**Int. Cl.[2] A61K** *31/70;* **C07G** *11/00, 3/00*

**U.S. Cl. 424—180** **8 Claims**

1. A compound of the formula:



I

wherein $R_1$ is a $C_3$-$C_6$ cycloalkyl; a $C_3$-$C_6$ cycloalkyl substituted by a halogen, hydroxy, methoxy, amino or dimethylamino group; phenyl or phenyl substituted with nitro, chlorine or methoxy; thiazyl, pyridyl, pyrazyl; or phenyl-alkyl group of the formula X—Phe—$(CH_2)_n$—, in which X is hydrogen, halogen, hydroxyl, amino, or nitro, and n is an integer from 1 to 2; $R_2$ is hydrogen, hydroxyl or acyloxy (R—COO—), where R is an alkyl having from 1 to 11 carbon atoms; and $R_3$ is hydrogen or trifluoroacetyl and salts thereof with pharmaceutically acceptable acids.

6. A pharmaceutical composition for inhibiting the growth of lymphocytic leukemia $P_{388}$ comprising a compound according to claim 1 in an amount sufficient to inhibit the growth thereof.

7. A method of inhibiting the growth of Lymphocytic leukemia $P_{388}$ which comprises administering to a host afflicted therewith, a compound according to claim 1, in an amount sufficient to inhibit the growth thereof.

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**4,166,849**

## PERUVOSIDE DERIVATIVES AND PROCESSES FOR THEIR PREPARATION

**Erich Cohnen, Hamburg, Fed. Rep. of Germany, assignor to Beiersdorf Aktiengesellschaft, Hamburg, Fed. Rep. of Germany**

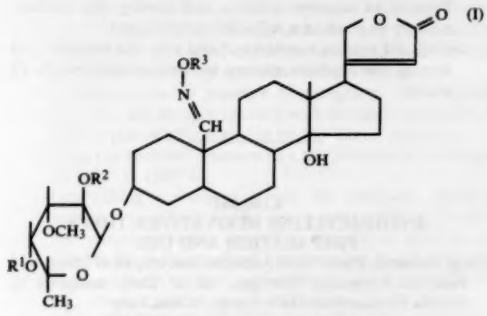
**Filed Jul. 17, 1978, Ser. No. 925,026**

**Claims priority, application Fed. Rep. of Germany, Jul. 30, 1977, 2734459**

**Int. Cl.[2] A61K** *31/705;* **C07J** *19/00*

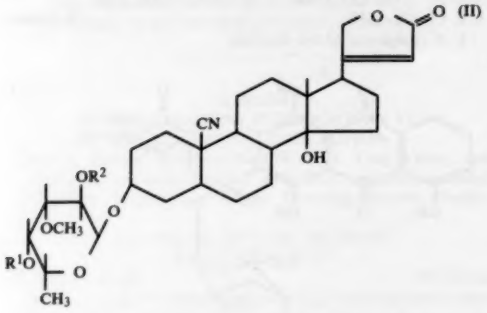
**U.S. Cl. 424—182** **2 Claims**

1. A compound of the formula



(I)

or of the formula



(II)

wherein $R^1$ and $R^2$ are the same or different and are selected from a hydrogen atom, an acyl group, an alkoxymethyl group, and a carboalkoxy group wherein the alkyl portion of said groups has 1–4 carbon atoms, and $R^3$ is an acyl group having 2–5 carbon atoms.

2. A pharmaceutical composition comprising an effective amount of the compound of claim 1 and a pharmaceutically acceptable carrier.

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**4,166,850**

**COMBATING PESTS WITH N-ACETYL-0-(2-CHLORO-1-FLUORO-ETHYL)-THIONO-PHOSPHORIC (PHOSPHONIC) ACID ESTER-AMIDES**

**Hellmut Hoffmann, Wuppertal; Dieter Arlt; Ingeborg Hammann, both of Cologne; Bernhard Homeyer, Leverkusen, and Wilhelm Stendel, Wuppertal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

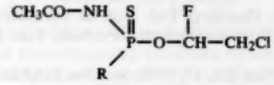
**Filed Aug. 8, 1978, Ser. No. 932,073**

**Claims priority, application Fed. Rep. of Germany, Aug. 26, 1977, 2738508**

**Int. Cl.[2] A01N** *9/36;* **C07F** *9/22*

**U.S. Cl. 424—220** **8 Claims**

1. An N-acetyl-O-(2-chloro-1-fluoro-ethyl)-thionophosphoric (phosphonic) acid ester-amide of the formula



in which

R is alkyl or alkoxy.

2. A method of combating arthropods or nematodes which comprises applying to the arthropods or nematodes, or to a habitat thereof, an arthropodicidally or nematicidally effective amount of a compound according to claim 1.

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**4,166,851**

**CERTAIN IMIDAZO(1,2A)PYRIDINE DERIVATIVES**

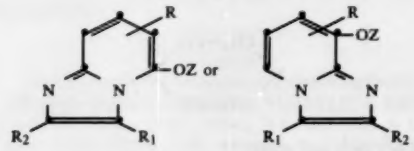
**John J. Baldwin, Lansdale, and William C. Lumma, Jr., Pennsburg, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.**

**Filed May 16, 1977, Ser. No. 796,958**

**Int. Cl.[2] C07D** *471/04;* **A61K** *31/44*

**U.S. Cl. 424—248.55** **19 Claims**

1. Compound having the formula



and pharmaceutically acceptable salts thereof wherein

Z is $—CH_2—CHOR_3—CH_2—NHR_4$ wherein $R_3$ is H or $C_2$-$C_{12}$ acyl and $R_4$ is $C_1$-$C_{12}$ alkyl,

R, $R_1$ and $R_2$ are $—SCF_3$, —CN, halogen, $C_1$-$_6$alkyl, $NH_2$, H, $C_1$-$C_6$ haloalkyl, $C_1$-$C_{12}$acyl, phenyl, $—COOR_5$ wherein $R_5$ is H, $C_1$-$C_6$ alkyl or $C_6$-$C_{12}$ carbocyclic aryl, $—CONR_6R_7$ wherein $R_6$ and $R_7$ when separate, are H or $C_1$-Alkyl and when joined, are $—CH_2(CH_2)_n—CH_2$, $—CH_2—CH_2—O—CH_2—CH_2—$, $—CH2—CH_2NH—CH_2CH_2—$, or $—CH_2—CH_2—N(CH_3)—CH_2—CH_2—$,

$C_1$-$C_6$alkylthio, $C_1$-$C_6$ alkylsulfinyl or $C_1$-$C_6$alkylsulfonyl.

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**4,166,852**

**PIPERAZINO-PYRIMIDINES AND THEIR USE AS SPASMOLYTIC AGENTS**

**Gerard P. M. H. Loiseau, Sceaux; Georges D. Mattioda, Enghien les Baines; Rene J. Millischer, Pringy, and Pierre M. J. Obellianne, Paris, all of France, assignors to Produits Chimiques Ugine Kuhlmann, Courbevoie, France**

**Continuation of Ser. No. 599,302, Jul. 25, 1975, abandoned, which is a continuation-in-part of Ser. No. 406,131, Oct. 12, 1973, abandoned. This application Feb. 28, 1977, Ser. No. 772,898**

**Claims priority, application France, Aug. 9, 1974, 74 27671**

**Int. Cl.[2] A61K** *31/505;* **C07D** *403/04*

**U.S. Cl. 424—251** **19 Claims**

1. The compound: 2-isopropyl-amino-4-N-methyl piperazino-6-chloro-5-methylthio-pyrimidine.

16. Process for the treatment of spasms in a human being which comprises administering to a human in need thereof, as a spasmolytic agent, an effective amount of a compound selected from the group consisting of:

2-isopropylamino-4-N-methylpiperazino-6-chloro-5-methylthio-pyrimidine;

2-ethylamino-4-N-methylpiperazino-6-chloro-5-methylthio-pyrimidine;

2-t-butylamino-4-N-methylpiperazino-6-chloro-5-methylthio-pyrimidine;

2-(N-methyl-N-phenyl)amino-4-N-methylpiperazino-6-chloro-5-methylthio-pyrimidine;

2-N-diethylamino-4-N-methylpiperazino-6-chloro-5-methylthio-pyrimidine;

2-allylamino-4-N-methylpiperazino-6-chloro-5-methylthio-pyrimidine;

2-cyclohexylamino-4-N-methylpiperazino-6-chloro-5-methylthio-pyrimidine;

2-n.pentylamino-4-N-methylpiperazino-6-chloro-5-methylthio-pyrimidine;
2-n.hexylamino-4-N-methylpiperazino-6-chloro-5-methylthio-pyrimidine;
2-benzylamino-4-N-methylpiperazino-6-chloro-5-methylthio-pyrimidine;
2-n.propylamino-4-N-methylpiperazino-6-chloro-5-methylthio-pyrimidine;
2-n.butylamino-4-N-methylpiperazino-6-chloro-5-methylthio-pyrimidine;
2-methylamino-4-N-(β-hydroxyethyl)piperazino-6-chloro-5-methylthio-pyrimidine; and
2-(N-methyl-N-benzoyl)amino-4-N-methylpiperazino-6-chloro-5-methylthio-pyrimidine,
or a salt thereof with a pharmaceutically acceptable acid, and a pharmaceutically acceptable carrier.

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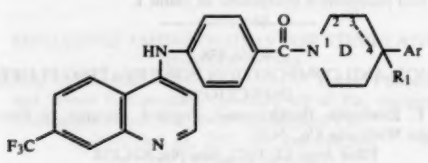
**4,166,853**
**ANTIHYPERTENSIVE 7-TRIFLUOROMETHYL-4-AMINOQUINOLONES**
**John M. McCall, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.**
**Filed May 5, 1978, Ser. No. 903,088**
**Int. Cl.[2] A61K *31/47*; C07D *215/44***
**U.S. Cl. 424—258** **30 Claims**

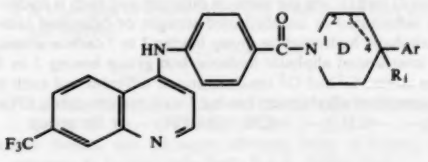
1. A compound of the formula



II

wherein D is a piperidino or 1,2,5,6-tetrahydropyridino ring;
wherein $R_1$ is hydrogen or hydroxy when the D is piperidino, or absent when the D is 1,2,5,6-tetrahydropyridino; and
wherein Ar is 2-oxo-1-benzimidazolinyl, phenyl, or phenyl substituted by one or two halo, trifluoromethyl, alkyl of one to 3 carbon atoms, inclusive, or alkoxy of one to 3 carbon atoms, inclusive, and halo is chloro, bromo, or fluoro; or the pharmacologically acceptable acid addition salts thereof.

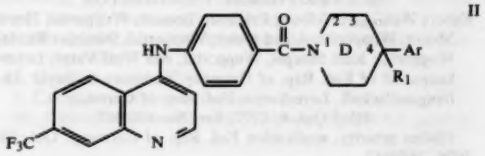
15. A pharmaceutical formulation for systemic administration to alleviate hypertension consisting essentially of an effective non-toxic amount of a compound of the formula



II

wherein D is a piperidino or 1,2,5,6-tetrahydropyridino ring;
wherein $R_1$ is hydrogen or hydroxy when the D is piperidino, or absent when the D is 1,2,5,6-tetrahydropyridino; and
wherein Ar is 2-oxo-1-benzimidazolinyl, phenyl, or phenyl substituted by one or two halo, trifluoromethyl, alkyl of one to 3 carbon atoms, inclusive, or alkoxy of one to 3 carbon atoms, inclusive, and halo is chloro, bromo, or fluoro; or the pharmacologically acceptable acid addition salts thereof.

23. A method of obtaining antihypertensive effects in a mammal which consists essentially of administering systemically to the mammal a pharmaceutical dosage unit form supplying an effective non-toxic amount for antihypertensive effects of a compound of the formula II:



II

wherein D is a piperidino or 1,2,5,6-tetrahydropyridino ring;
wherein $R_1$ is hydrogen or hydroxy when the D is piperidino, or absent when the D is 1,2,5,6-tetrahydropyridino; and
wherein Ar is 2-oxo-1-benzimidazolinyl, phenyl, or phenyl substituted by one or two halo, trifluoromethyl, alkyl of one to 3 carbon atoms, inclusive, or alkoxy of one to 3 carbon atoms, inclusive, and halo is chloro, bromo, or fluoro; or the pharmacologically acceptable acid addition salts thereof.

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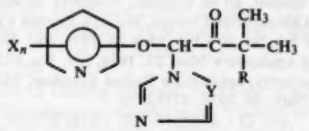
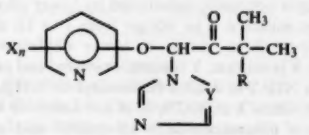
**4,166,854**
**SUBSTITUTED 1-PYRIDINYLOXY-1-(IMIDAZOLYL)-2-BUTANONE COMPOUNDS AND THEIR USE AS FUNGICIDES**
**Chrislyn M. Carson; Robert J. Ehr, both of Pittsburg, and Richard B. Rogers, Concord, all of Calif., assignors to The Dow Chemical Company, Midland, Mich.**
**Filed Nov. 2, 1978, Ser. No. 956,957**
**Int. Cl.[2] C07D *401/06*; A61K *31/44***
**U.S. Cl. 424—263** **36 Claims**

1. A substituted 1-pyridinyloxy-1-(triazolyl or imidazolyl)-2-butanone compound corresponding to the formula



wherein X independently represents halogen, methyl, trichloromethyl, trifluoromethyl, or cyano; n represents an integer of 0 to 3; Y represents —N; and R represents methyl, methoxy, or ethoxy.

25. A method for controlling fungi which attack plants which comprises applying to plants, plant parts, or soil a composition containing as the active ingredient, a fungicidally effective amount of a substituted 1-pyridinyloxy-1-(triazolyl or imidazolyl)-2-butanone compound corresponding to the formula



wherein X independently represents halogen, methyl, trichloromethyl, trifluoromethyl, or cyano; n represents an integer of 0 to 3; Y represents —N; and R represents methyl, methoxy, or ethoxy, in intimate admixture with an inert carrier therefor.

4,166,855

## 1,4-DIHYDRO-2,6-DIMETHYL-4-(3-NITROPHENYL)-3,5-PYRIDINEDICARBOXYLIC ACID ESTER, AND ITS USE AS A PERIPHERAL VASODILATOR

Egbert Wehinger, Velbert; Friedrich Bossert, Wuppertal; Horst Meyer, Wuppertal; Arend Heise, Wuppertal; Stanislav Kazda, Wuppertal; Kurt Stoepel, Wuppertal, and Wulf Vater, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

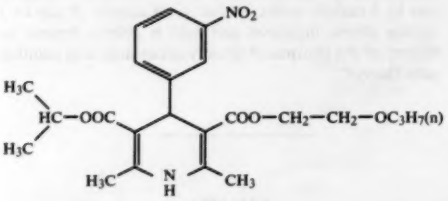
Filed Oct. 6, 1977, Ser. No. 840,065

Claims priority, application Fed. Rep. of Germany, Oct. 30, 1976, 2650013

Int. Cl.[2] C07D *213/55;* A61K *31/44*

U.S. Cl. 424—266 9 Claims

1. 1,4-Dihydro-2,6-dimethyl-4-(3-nitrophenyl)-3,5-pyridinedicarboxylic acid isopropyl 2-propoxyethyl ester of the formula I



I

7. A method of combating peripheral perfusion disturbances in warm-blooded animals in need of such treatment which comprises administering to the animals an effective amount of the compound of claim 1 either alone or in admixture with a inert diluent or in the form of a medicament.

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4,166,856

## THIAZOLE AND ISOTHIAZOLE DERIVATIVE AS BLOCKERS OF HISTAMINE $H_2$-RECEPTORS

Graham J. Durant; Charon R. Ganellin, both of Welwyn Garden City; Geoffrey R. Owen, High Wycombe, and Rodney C. Young, Bengeo, all of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England

Division of Ser. No. 686,185, May 13, 1976, Pat. No. 4,098,898.

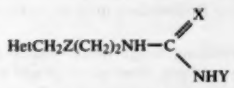
This application Mar. 31, 1978, Ser. No. 892,231

Claims priority, application United Kingdom, May 21, 1975, 21817/75; Nov. 20, 1975, 47782/75

Int. Cl.[2] A61K *31/425;* C07D *277/38*

U.S. Cl. 424—270 10 Claims

1. A compound of the formula:



wherein X is sulphur, $CHNO_2$, N.CN or NH; Y is amino, lower alkylamino, di(lower alkyl)amino, lower alkoxy, phenylethyl, imidazolylethyl, allyl, 2,2,2-trifluoroethyl, or $(CH_2)_nR$; Z is sulphur or methylene; Het is a thiazole or isothiazole ring which ring is optionally substituted by lower alkyl, hydroxy, halogen or amino; n is an integer from 1 to 12; and R is hydroxy, lower alkoxy, amino or lower alkylamino; provided that when X is sulphur, Y is not phenylethyl and provided that when X is NH, Y is 2,2,2-trifluoroethyl or $(CH_2)_nR$ and provided that when X is N.CN, Y is not amino or lower alkylamino, or a pharmaceutically acceptable acid addition salt thereof.

8. A method of blocking histamine $H_2$-receptors which comprises administering to an animal in need thereof in an effective amount to block said receptors a compound of claim 1.

4,166,857

## N-HETERO SUBSTITUTED CYCLOBUTENONES

Charon R. Ganellin, Welwyn Garden City, and Rodney C. Young, Bengeo, both of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England

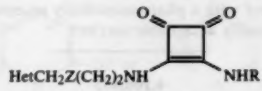
Division of Ser. No. 833,404, Sep. 15, 1977, Pat. No. 4,120,960, which is a division of Ser. No. 705,216, Jul. 14, 1976, Pat. No. 4,062,863. This application Jul. 27, 1978, Ser. No. 928,337

Claims priority, application United Kingdom, Jul. 3, 1975, 31971/75

Int. Cl.[2] A61K *31/425;* C07D *275/02*

U.S. Cl. 424—270 6 Claims

1. A compound of the formula:



wherein R is hydrogen, lower alkyl or $(CH_2)_2Z'CH_2Het'$; Z and Z' may each be sulphur or methylene; and Het and Het' may each be a thiazole ring or an isothiazole ring or Het' may be an imidazole ring optionally substituted by methyl or bromo; or a pharmaceutically acceptable acid addition salt thereof.

6. A method of blocking histamine $H_2$-receptors which comprises administering to an animal in an effective amount to block said receptors a compound of claim 1.

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4,166,858

## METHOD AND COMPOSITION FOR TREATING FLUKE INFECTIONS

Dewi T. Rowlands, Berkhamsted, England, assignor to Burroughs Wellcome Co., N.C.

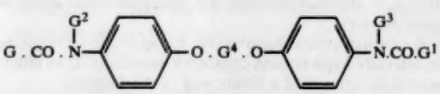
Filed Aug. 12, 1977, Ser. No. 824,175

Claims priority, application United Kingdom, Aug. 13, 1976, 33827/76; Sep. 30, 1976, 40722/76; Oct. 29, 1976, 45027/76; Dec. 14, 1976, 54053/76

Int. Cl.[2] A61K *31/415, 31/165*

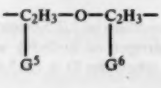
U.S. Cl. 424—273 B 33 Claims

1. A combination suitable for use in treating fluke infections in mammals comprising an effective anthelmintic amount of a compound of formula (A):



(A)

wherein G and $G^1$ are the same or different and each is hydrogen, a substituted or unsubstituted straight or branched saturated aliphatic hydrocarbon group having 1 to 7 carbon atoms, or an unsaturated aliphatic hydrocarbon group having 2 to 4 carbon atoms; $G^2$ and $G^3$ are the same or different and each is hydrogen or an alkyl group having 1 to 4 carbon atoms; $G^4$ is $—CH_2—$, $—(CH_2)_2—$, $—CH_2—O—CH_2—$, or the group



wherein $G^5$ and $G^6$ are the same or different and each is hydrogen or an alkyl group having 1 to 3 carbon atoms; and when $G^1$ or $G^2$ is a saturated aliphatic hydrocarbon group it may be substituted by a hydroxy group, an amino group, an N-alkylamino group, an N,N-dialkylamino group, or an alkanoyl group, wherein 'alkyl' and 'alkanoyl' groups each have from 1 to 4 carbon atoms, or a salt thereof taken together with an effective flukicidal potentiating amount of a potentiating benzimidazole, being a benzimidazole which when administered

alone at a specific dose effects less than 70% clearance of a 12 week old *F. hepatica* infection in sheep but which at the same dose will decrease the minimum flukicidal effective dose of diamphenethide to less than 120 mg/kg, provided that when the compound of formula (A) is diamphenethide the potentiating benzimidazole is other than oxfendazole or a salt thereof.

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**4,166,859**

## 2-BROMO-6-FLUORO-N-(2-IMIDAZOLIDINYLIDENE)-BENZAMINE AND SALTS THEREOF AND THE USE TO TREAT HYPERTENSION

**Helmut Stähle; Herbert Köppe; Werner Kummer, all of Ingelheim am Rhein, and Wolfgang Hoefke, Budenheim, all of Fed. Rep. of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Fed. Rep. of Germany**

**Filed Jun. 20, 1977, Ser. No. 808,409**

**Claims priority, application Fed. Rep. of Germany, Jul. 3, 1976, 2630060**

**Int. Cl.[2] A61K** *31/415*

**U.S. Cl. 424—273 R** **3 Claims**

1. 2-Bromo-6-fluoro-N-(2-imidazolidinylidene)-benzamine or a non-toxic, pharmacologically acceptable acid addition salt thereof.

3. The method of lowering the blood pressure of a warm-blooded animal in need thereof, which comprises perorally or parenterally administering to said animal an effective antihypertensive amount of compound of claim 1.

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**4,166,860**

## IMIDAZOLE AMIDINOUREAS FOR STIMULATING $H_2$-RECEPTORS

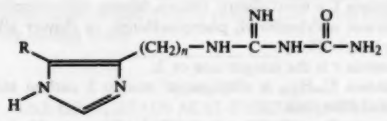
**George H. Douglas, Malvern; Bernard J. Burns, Philadelphia, and Henry F. Campbell, Lansdale, all of Pa., assignors to William H. Rorer, Inc., Fort Washington, Pa.**

**Filed Oct. 11, 1977, Ser. No. 840,934**

**Int. Cl.[2] A61K** *31/415*

**U.S. Cl. 424—273 R** **8 Claims**

1. A method of stimulating histamine $H_2$-receptors in mammals which comprises administering parenterally thereto between 0.5 mg/kg-70 mg/kg per day of a compound of the formula



where:

n is 1–3 and

R is hydrogen or lower alkyl; and a non-toxic acid addition salt thereof.

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**4,166,861**

## PHARMACOLOGICALLY ACTIVE POLYPHENOLIC SUBSTANCES

**Attilio Bonati, and Giuseppe Mustich, both of Milan, Italy, assignors to Inverni della Beffa S.p.A., Milan, Italy**

**Filed Mar. 22, 1977, Ser. No. 780,171**

**Claims priority, application United Kingdom, Mar. 23, 1976, 11666/76**

**Int. Cl.[2] A61K** *31/335*

**U.S. Cl. 424—278** **10 Claims**

1. A pharmaceutical composition for inducing a choleretic effect, comprising a pharmaceutically acceptable diluent or carrier and as active ingredient a choleretic effect-inducing amount of a compound selected from the group consisting of epicatechin, catechin pentacaffeate, catechin penta (acetylferulate), epicatechin penta (acetylferulate) and catechin penta 2-(p-chlorophenoxy)-2-methyl propionate.

4. A method of inducing a hypolipaemic or hypocholesterolaemic effect in an animal which comprises administering to said animal an anti-hyperlipaemic or anti-hypercholesterolaemic effective amount of a compound selected from the group consisting of epicatechin, catechin pentacaffeate, catechin penta (acetyferulate), epicatechin penta (acetylferulate) and catechin penta 2-(p-chlorophenoxy)-2-methyl propionate as active ingredient.

7. Catechin pentacaffeate.

8. Catechin penta(acetylferulate).

10. Catechin penta 2-(p-chlorophenoxy)-2-methyl propionate.

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**4,166,862**

## ANIMAL FEED CONTAINING ANABOLIC ISOFLAVONES

**Laszlo Feuer; Mihály Nógrádi; Agnes Géttsegen; Borbala Vermes; János Strelisky; Andras Wolfner; Lorant Farkas; Sandor Antus, and Maria K. Tóth, all of Budapest, Hungary, assignors to Chinoin Gyogyszer es Vegyeszeti Termekek Gyara Rt., Budapest, Hungary**

**Continuation-in-part of Ser. No. 146,773, May 25, 1971, Pat. No. 3,833,730. This application May 16, 1974, Ser. No. 470,444**

**Int. Cl.[2] A61K** *31/35*

**U.S. Cl. 424—283** **18 Claims**

1. An animal feed containing 0.00002 to 0.1% by weight of 2-methyl-7-methoxy-4'-nitroisoflavone as a weight-gain-promoting anabolic ingredient.

2. An animal feed containing 0.00002 to 0.1% by weight of 7-(hydroxyethoxy)-2-methylisoflavone as a weight-gain-promoting anabolic ingredient.

5. An animal feed containing 0.00002 to 0.1% by weight of 7-p-nitrobenzyloxyisoflavone as a weight-gain-promoting anabolic ingredient.

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**4,166,863**

## ANTIBACTERIAL COMPOUNDS

**Kong Luk, Cranleigh; John P. Clayton, Horsham, and Norman H. Rogers, Rudgwick, all of England, assignors to Beecham Group Limited, Great Britain**

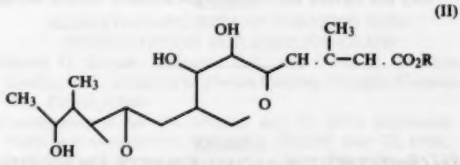
**Division of Ser. No. 803,466, Jun. 6, 1977, Pat. No. 4,102,901. This application Jan. 30, 1978, Ser. No. 873,394**

**Claims priority, application United Kingdom, Jun. 15, 1976, 24712/76; Sep. 29, 1976, 40472/76; Mar. 1, 1977, 8647/77**

**Int. Cl.[2] A61K** *31/35*

**U.S. Cl. 424—283** **15 Claims**

8. A method of treating bacterial infections in humans and animals which comprise administering to a human or animal in need thereof, an antibacterially effective amount of a compound of the formula (II):



(II)

wherein R is alkyl of 1 to 20 carbon atoms, alkenyl of 2 to 8 carbon atoms of alkynyl of 2 to 8 carbon atoms.

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**4,166,864**

## PESTICIDAL UNSYMMETRICAL BIS-ARYLCARBAMATE DISULFIDE COMPOUNDS

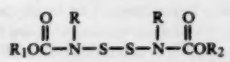
**Themistocles D. J. D'Silva, South Charleston, W. Va., assignor to Union Carbide Corporation, New York, N.Y.**

**Filed Mar. 28, 1977, Ser. No. 781,986**

**Int. Cl.[2] A01N** *9/28;* **C07D** *307/86;* **A01N** *9/12;* **C07C** *125/06*

**U.S. Cl. 424—285** **26 Claims**

1. A compound of the formula:



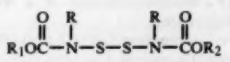
wherein:

R is alkyl having from 1 to 4 carbon atoms;

$R_1$ and $R_2$ are different and are naphthyl, tetrahydronaphthyl, dihydrobenzofuranyl, benzofuranyl, benzodioxanyl, methylenedioxyphenyl, benzothienyl or indanyl all of which may be either unsubstituted or substituted with one or more alkyl groups; or either unsubstituted or substituted phenyl, wherein the permissible substituents are one or more alkyl, alkenyl, alkynyl, alkoxy, alkynyloxy, phenoxy, alkylsulfonyl, alkylsulfinyl, alkylthio, alkenylthio,, alkoxycarbonylamino, dialkylaminoalkyleneamino, alkynylthio, alkylthioalkyl, alkylsulfinylalkyl, alkylsulfonylalkyl, amino, alkylamino, dialkylamino, trihalomethyl, halo, nitro, cyano, cycloalkyl, formamidino, 2-dioxanyl, 2-dioxolanyl, 2-dithiolanyl, 2-oxathiolanyl or dicyanoethenylene;

with the proviso that $R_1$ and $R_2$ substituents individually may not include more than eight aliphatic carbon atoms.

**10**. An insecticidal and miticidal composition comprising an acceptable carrier and as the active toxicant an insecticidally and miticidally effective amount of a compound of the formula:



wherein:

R is alkyl having from 1 to 4 carbon atoms;

$R_1$ and $R_2$ are different and are naphthyl, tetrahydronaphthyl, dihydrobenzofuranyl, benzofuranyl, benzodioxanyl, methylenedioxyphenyl, benzothienyl or indanyl all of which may be either unsubstituted or substituted with one or more alkyl groups; or either unsubstituted or substituted phenyl, wherein the permissible substituents are one or more alkyl, alkenyl, alkynyl, alkoxycarbonylamino, alkoxy, alkynyloxy, phenoxy, alkylsulfinyl, alkylsulfonyl, alkylthio, alkenylthio, dialkylaminoalkyleneamino, alkynylthio, alkylthioalkyl, alkylsulfinylalkyl, alkylsulfonylalkyl, amino, alkylamino, dialkylamino, trihalomethyl, halo, nitro, cyano, cycloalkyl, formamidino, 2-dioxanyl, 2-dioxalanyl, 2-dithiolanyl, 2-oxathiolanyl or dicyanoethenylene;

with the proviso that $R_1$ and $R_2$ substituents individually may not include more than eight aliphatic carbon atoms.

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**4,166,865**

## MACROTETROLIDE ANIMAL GROWTH PROMOTOR

**Koji Sakamoto; Takeshi Asano, both of Takasaki; Kazuo Mizuochi, Tokyo; Kanemichi Sasaki, Koshigaya, and Kouji Hasegawa, Omiya, all of Japan, assignors to Chugai Seiyaku Kabushiki Kaisha and Nippon Kayaku Kabushiki Kaisha, both of Tokyo, Japan**

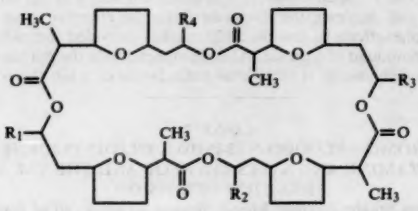
**Filed Aug. 15, 1978, Ser. No. 933,912**

**Claims priority, application Japan, Aug. 18, 1977, 52-98996**

**Int. Cl.[2] A61K *31/34***

**U.S. Cl. 424—285** **10 Claims**

**1**. A method for promoting the growth of domestic animals characterized by orally administering, to the animals, an effective amount of at least one macrotetrolide antibiotic substance represented by the general formula



wherein $R_1$, $R_2$, $R_3$ and $R_4$ each represents a lower alkyl group.

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**4,166,866**

## IMMUNOSUPPRESSIVE METHOD WITH DITHIOCARBAMATES

**Hewitt G. Wight; Tracey G. Call, both of San Luis Obispo, Calif., and Martin L. Mortensen, Kila, Mont., assignors to The California Polytechnic State University Foundation, San Luis Obispo, Calif.**

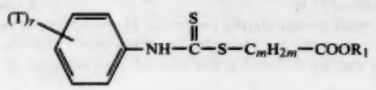
**Division of Ser. No. 848,433, Nov. 4, 1977, Pat. No. 4,130,578, which is a continuation-in-part of Ser. No. 773,064, Feb. 28, 1977, Pat. No. 4,110,444, which is a continuation-in-part of Ser. No. 579,449, May 21, 1975, abandoned. This application Mar. 8, 1978, Ser. No. 884,429**

**Int. Cl.[2] A61K *31/27***

**U.S. Cl. 424—300** **4 Claims**

**1**. A method of treating in a mammal exhibiting allographic rejection phenomena from tissue transplantation which comprises:

systemically administering to said mammal in a pharmaceutically acceptable dosage form a dithiocarbanilate of the formula



wherein T is nitro, fluoro, chloro, bromo, trifluoromethyl, lower alkylsulfonyl, phenylsulfonyl, or (lower alkyl)-phenylsulfonyl;

wherein r is the integer one or 2;

wherein $C_mH_{2m}$ is alkylene of one to 5 carbon atoms, inclusive; and

wherein $R_1$ is hydrogen or alkyl of one to 12 carbon atoms, inclusive;

in not less than a non-toxic amount effective to prolong the viability of the transplanted tissue.

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**4,166,867**

## PALATABILITY IN HORSE FEEDS

**Norman L. Betz, St. Louis, Mo.; Kent J. Lanter, Belleville; Leslie H. Breuer, Alhambra, both of Ill., and Frederick H. Steinke, Crestwood, Mo., assignors to Ralston Purina Company, St. Louis, Mo.**

**Filed Feb. 9, 1978, Ser. No. 876,306**

**Int. Cl.[2] A23L *1/30*; A23K *1/00***

**U.S. Cl. 426—73** **10 Claims**

**1**. An improved method of making a high performance horse feed comprising the steps of grinding and extruding at from about 115° to about 163° C. to a bushel weight of about 32 pounds per bushel and a particle size of from $\frac{1}{8}$ to 3 inches in length and a mean diameter of from 0.15 to 0.6 inches, a combination comprising, by weight of the combination, from about 35 to 65% farinaceous material selected from the group consisting of wheat, wheat flour, wheat meal by-products and corn from 10 to 35% proteinaceous material selected from the group consisting of soybean mean, soy flour, peanut meal,

cottonseed meal and safflower seed meal, from about 5 to 30% fibrous materials selected from the group consisting of soy hulls, cottonseed hulls, and rice hulls and from 3 to 4% nutritional supplements and between about 25 and 35% added moisture based on the weight of the combination; and thereafter drying to about 10% and coating the extruded combination with from 2 to 10% by weight vegetable oil selected from the group consisting of soybean oil, corn oil, safflower oil, cottonseed oil and peanut oil;

said improvement comprising adding from about 0.0003% to about 0.003% lemon oil to the oil coating.

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**4,166,868**

## MANUFACTURE OF READY-TO-EAT RICE

**Momofuku Ando, 7-34, Masumicho, Osaka, Japan; Junichi Minami, Osaka; Mitsumune Takatsu, Shiga; Fumio Ohnishi, and Makoto Sawada, both of Osaka, all of Japan, assignors to Momofuku Ando, Osaka, Japan**

**Continuation of Ser. No. 635,254, Nov. 25, 1975, abandoned, which is a continuation-in-part of Ser. No. 537,821, Dec. 31, 1974, abandoned. This application Oct. 27, 1977, Ser. No. 846,497**

**Int. Cl.[2] A23B** *7/02;* **A23L** *1/182*

**U.S. Cl. 426—441** **9 Claims**

1. A process for preparing ready-to-eat rice which can be reconstituted into a foodstuff essentially in the form of original rice grains, said process consisting essentially of

(1) soaking grains of an edible rice in water or liquid seasoning, said water or said liquid seasoning having a temperature lower than 70° C. to result in soaked rice having a water content of 30–34% by weight,

(2) gelatinizing the soaked rice,

(3) reducing the moisture content of the gelatinized rice to 18–70% by weight,

(4) forcibly passing the resultant rice grains between rolls spaced 0.1–1.0 mm apart from each other so that the grains are pressed and flattened and the internal structure of the grain is irreversibly changed but the grains are not cracked,

(5) reducing the moisture content of the pressed and flattened rice grains to 8–25% by weight, and

(6) frying the thus obtained rice grains in oil at a temperature of 130°–200° C. so as to puff the grains, such that they reconstitute to said form of original rice grains upon adding boiling water.

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**4,166,869**

## USE OF CERTAIN ACYL-PYRIMIDINES AS FLAVOURING AGENTS

**Ivon Flament, Petit-Lancy, Switzerland, assignor to Firmenich, S.A., Geneva, Switzerland**

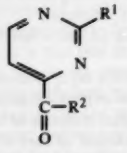
**Filed Jan. 6, 1978, Ser. No. 867,367**

**Claims priority, application Switzerland, Jan. 10, 1977, 227/77**

**Int. Cl.[2] A23L** *1/226, 1/231, 1/234*

**U.S. Cl. 426—537** **6 Claims**

1. Process for enhancing or improving animal, grilled, roasted and fatty flavour notes in foodstuffs, beverages and animal feeds which comprises the step of adding thereto from about 0.02 to about 20 parts per million by weight, based on the total weight of the said materials, of at least one of the compounds of formula



wherein symbol $R^1$ represents a hydrogen atom or a methyl radical and $R^2$ stands for a lower alkyl radical containing from 1 to 6 carbon atoms.

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**4,166,870**

## MANUFACTURE OF ELECTRODES FOR ELECTROCHEMICAL CELLS

**Kenneth Henson, Ramsbottom, England, assignor to Unigate Limited, London, England**

**Continuation of Ser. No. 745,271, Nov. 26, 1976, abandoned, which is a continuation of Ser. No. 500,780, Aug. 26, 1974, abandoned. This application Oct. 3, 1977, Ser. No. 839,057**

**Claims priority, application United Kingdom, Aug. 24, 1973, 40300/73**

**Int. Cl.[2] H01M** *4/04, 4/74*

**U.S. Cl. 427—122** **11 Claims**

1. A process of manufacturing a porous electrode support structure for a zinc halogen electric cells, comprising forming a first mix of 20–100 grams of 50% compressed acetylene black, 450–750 ml. water and 5 ml. of acetone by mixing gently, forming a second mix of 50 ml. latex and 50–250 ml. water, adding said second mix slowly to said first mix while continuing to mix gently such that the resulting mix is in porous crumbly form, applying a layer of said crumbly mix to a sheet of expanded anodizable metal selected from at least one metal of Groups IV(A) and V(A) of the Periodic Table according to Mendeleef, and applying said crumbly mix layer to said metal sheet under a pressure of about 2.5 tons per square inch, said crumbly mix layer being of sufficient thickness to produce an electrode having a thickness of about 0.050 inch.

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**4,166,871**

## IODINE STAINED LIGHT POLARIZER

**Norman W. Schuler, Lexington, Mass., assignor to Polaroid Corporation, Cambridge, Mass.**

**Continuation of Ser. No. 810,996, Jun. 29, 1977, abandoned. This application Apr. 27, 1978, Ser. No. 900,728**

**Int. Cl.[2] G02B** *1/08, 1/10, 5/30*

**U.S. Cl. 427—163** **12 Claims**

1. A method of preparing a light polarizing element which comprises:

uniaxially stretching a film of polyvinyl alcohol; and

staining the stretched film with an iodine solution; and

treating the stained film with an aqueous solution containing zinc ion in a concentration effective to stabilize absorption of red light by the polarizer against degradation on heating.

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**4,166,872**

## MIGRATION-RESISTANT FORMING SIZE COMPOSITIONS FOR FIBROUS GLASS

**Richard H. Karpik, Anderson, S.C., and David H. Griffiths, Shelby, N.C., assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio**

**Continuation of Ser. No. 285,166, Aug. 31, 1972, abandoned, which is a continuation of Ser. No. 523,498, Jan. 12, 1966, abandoned, which is a continuation-in-part of Ser. No. 92,745, Mar. 2, 1961, abandoned. This application Jan. 17, 1975, Ser. No. 541,760**

**Int. Cl.[2] C03C** *7/30;* **C08L** *3/02*

**U.S. Cl. 428—35** **11 Claims**

1. In the coating of glass fibers with a forming size composition which contains an aqueous dispersion of an amylaceous film-forming material, the improvement comprising the utilization of a hybrid corn starch consisting essentially of between 50 to 70% by weight of amylose and between 30 to 50% by weight of amylopectin, cooked at a temperature below approximately 212° F. as said amylaceous film-forming material, and whereby said fibers are coated with a starch material that includes swollen unburst starch granules.

4,166,873

## DIISOCYANATE-MODIFIED POLYESTERS AS HOT MELT ADHESIVES AND COATINGS

**Kenneth D. Gilliam, Sugar Grove, and Edward E. Paschke, Wheaton, both of Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.**

**Continuation-in-part of Ser. No. 635,033, Nov. 25, 1975, abandoned, which is a continuation-in-part of Ser. No. 506,118, Sep. 16, 1974, abandoned, which is a division of Ser. No. 399,063, Sep. 20, 1973, abandoned. This application Oct. 7, 1977, Ser. No. 840,406**

**Int. Cl.[2] D04D** *7/04;* **B65D** *11/16*

**U.S. Cl. 428—35** **31 Claims**

1. A process for adhering surfaces comprising:

(a) combining about 2 to 10 parts by weight of a diisocyanate with 100 parts of a polyester essentially formed from a wholly aromatic diacid or diester component and an aliphatic or cycloaliphatic diol component and having an inherent viscosity of about 0.3 to 1.5 dl/g;

(b) modifying the polyester by heating the combination above the melt temperature of the polyester and at least above about 260° C. while mixing;

(c) placing the modified polyester between the surfaces;

(d) compressing the surfaces and modified polyester at a temperature above the softening point of the modified polyester; and

(e) cooling the bonded surfaces.

20. A process for forming a durable resin coating on a substrate comprising:

(a) combining about 2 to 10 parts by weight of a diisocyanate with 100 parts of a polyester essentially formed from a wholly aromatic diacid or diester component and an aliphatic or cycloaliphatic diol component and having an inherent viscosity of about 0.3 to 1.5 dl/g;

(b) modifying the polyester by heating the combination above the melt temperature of the polyester and at least above about 260° C. while mixing;

(c) covering the substrate with the modified polyester resin;

(d) heating the covered substrate to a temperature sufficient to fuse the resin; and

(e) cooling the coated substrate.

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4,166,874

## CRASHWORTHY FUEL CELL REPAIR

**John E. McCready, Rome, Ga., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Sep. 22, 1978, Ser. No. 944,819**

**Int. Cl.[2] B65D** *25/00;* **C08L** *75/08*

**U.S. Cl. 428—35** **5 Claims**

1. An elastomeric crashworthy fuel tank having a portion of its body formed of a fabric impregnated with a metal oxide cured polysulfide polymer in combination with an aromatic diamine cured urethane polymer, the urethane being a diisocyanate-caprolactone polyol reaction product in the form of an isocyanate terminated prepolymer having 1 to 10 isocyanate groups and a molecular weight of 800 to 5,000, the polysulfide being a sodium polysulfide-organic dihalide reaction product in the form of a liquid thiol terminated polymer having a molecular weight of 1,000 to 10,000 and bis-(ethylene oxy) methane groups joined by disulfide linkages.

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4,166,875

## FREE-FLOWING PACKAGING MATERIAL

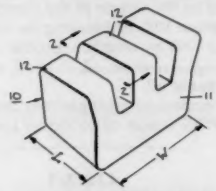
**Harry Bussey, Jr., P.O. Box 115, Serpentine Dr., Navesink, N.J. 07752**

**Filed Oct. 7, 1977, Ser. No. 840,293**

**Int. Cl.[2] B32B** *3/00*

**U.S. Cl. 428—159** **13 Claims**

1. A loose fill packaging material comprising a plurality of expanded resilient thermoplastic elements, each said element having a body portion and three leg portions which extend substantially from said body portion and define recesses between said leg portions, wherein each said leg portion has a




width which is greater than the corresponding width of a recess.

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4,166,876

## TRANSPARENT, ELECTRICALLY CONDUCTIVE LAMINATED STRUCTURE AND PROCESS FOR PRODUCTION THEREOF

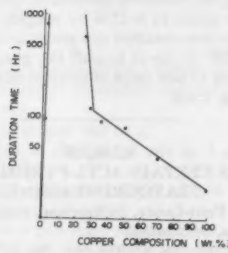
**Kiyoshi Chiba, Niiza; Kunio Itoh, Hino; Yuji Mitani, Hino; Utami Yonemura, Hino, and Shigenobu Sobajima, Hachioji, all of Japan, assignors to Teijin Limited, Japan**

**Filed Mar. 23, 1978, Ser. No. 889,450**

**Claims priority, application Japan, Mar. 28, 1977, 52-34275; Apr. 15, 1977, 52-042569; Dec. 21, 1977, 52-152955**

**Int. Cl.[2] B32B** *7/02, 27/36, 15/04*

**U.S. Cl. 428—215** **11 Claims**




1. A transparent, electrically conductive laminated structure comprising:

(A) a transparent solid substrate,

(B) a thin layer of an oxide of titanium in contact with the said substrate,

(C) a thin layer of an electrically conductive metal in contact with the said layer (B),

(D) a thin layer of an oxide of titanium in contact with the said layer (C), and

(E) with or without a transparent top layer in contact with the said layer (D), wherein:

(i) the said substrate (A) is a film-forming synthetic resin layer and

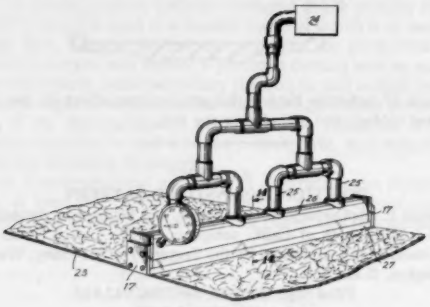
(ii) the said layer (B) is a layer of an oxide of titanium derived from a layer of an organic titanium compound and contains organic residual moieties of the said organic titanium compound, the amount of said organic residual moieties being 0.1–30% by weight based on the weight of the said layer (B).

4,166,877

## NON-WOVEN FABRIC LIGHTLY FIBER-ENTANGLED

Ralph E. Brandon, Lewisburg, Pa.; Michael Ring, Warwick, and Raymond Redner, III, Vails Gate, both of N.Y., assignors to International Paper Company, New York, N.Y.

Continuation-in-part of Ser. No. 708,537, Jul. 26, 1976, Pat. No. 4,085,485. This application Jun. 23, 1977, Ser. No. 808,771
Int. Cl.[2] D04H *3/08*
U.S. Cl. 428—221 3 Claims



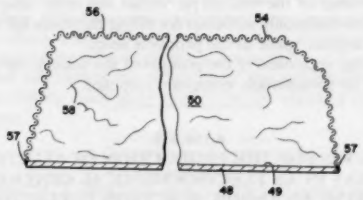
1. A uniformly and lightly fiber-entangled, base sheet for a non-woven fabric that is non-apertured and non-streaked and that has an entanglement frequency of less than about 20, an entanglement completeness of less than about 0.5 and an internal bond value of less than about 0.1.

4,166,878

## GAS TURBINE ENGINE INTERNAL INSULATION COMPRISING METALLIC MESH—RESTRAINED CERAMIC FIBER LAYER

LeRoy R. Thompson, and Edward G. Meints, both of Peoria, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Division of Ser. No. 728,656, Oct. 1, 1976, Pat. No. 4,083,180. This application Mar. 2, 1978, Ser. No. 882,840
Int. Cl.[2] B32B *3/24, 5/02;* B65D *25/16, 25/18*
U.S. Cl. 428—256 3 Claims



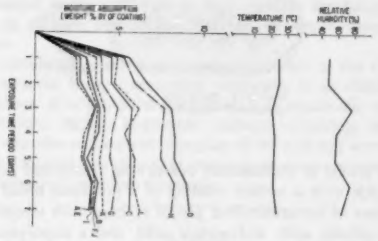
1. An improved replaceable insulation pack comprising a high temperature resistant relatively flexible and thin metallic sheet having held against a first side thereof, a porous insulation blanket formed of interlaced ceramic fibers with a fine mesh of metal attached to said sheet and covering the surface of said blanket which is not abutted to said sheet, said mesh serving to hold said blanket against said sheet, said blanket not being bonded to said sheet by a bonding agent and a binder not being used in said blanket to bind said fibers to one another.

4,166,879

## GAS-SHIELDED-TYPE COATED ARC WELDING ELECTRODE

Kuniaki Hayashi, and Takatoshi Tomoyasu, both of Kamakura, Japan, assignors to Kobe Steel, Ltd., Kobe, Japan

Filed Aug. 6, 1976, Ser. No. 712,396
Claims priority, application Japan, Aug. 7, 1975, 50-96553
Int. Cl.[2] B23K *35/365*
U.S. Cl. 428—385 2 Claims



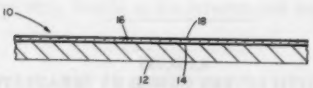
1. In a gas-shielded-type coated arc welding electrode of improved moisture resistance and usability consisting of a mild steel core and a coating comprising 20–40% by weight of organic material and a sodium water glass binder in an amount sufficient to bind the flux components, the improvement which comprises a coating which contains from 5 to 25% of anhydrous sodium silicate by weight of said organic material wherein the mole ratio of $SiO_2/Na_2O$ in said anhydrous sodium silicate is 2.5 to 3.5.

4,166,880

## SOLAR ENERGY DEVICE

Joseph J. Loferski, Providence, and Barton Roessler, Barrington, both of R.I., assignors to Solamat Incorporated, Barrington, R.I.

Filed Jan. 18, 1978, Ser. No. 870,369
Int. Cl.[2] F24J *3/02;* H01L *27/14, 31/00*
U.S. Cl. 428—457 2 Claims



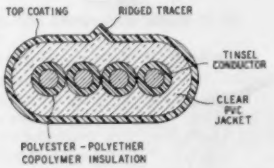
1. A selective absorber panel for converting solar energy to useful heat energy which comprises a base and a layer of semiconductor overlying said base, said base being of metal and having a surface toward said semiconductor reflective of infrared, and said semiconductor being absorptive to sunlight, said semiconductor being arc plasma sprayed, said panel including a layer of transparent conducting oxide over said layer of semiconductor, said panel also including an insulating film thin enough to permit tunnelling of current carriers interposed between the semiconductor and the transparent conducting oxide layers to produce an efficient photovoltaic cell, in which panel the semiconductor is p-type silicon, the insulating film is a native oxide of silicon, and the transparent conducting oxide is indium-tin oxide.

**4,166,881**

## TOP COATED PVC ARTICLES

**Wayne I. Congdon, Indianapolis, Ind.; John J. Mottine, Asbury Park, N.J., and William C. Vesperman, Belair, Md., assignors to Western Electric Company, New York, N.Y. and Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Dec. 27, 1977, Ser. No. 864,159**
**Int. Cl.[2] B32B** *15/08, 27/36;* **H01B** *3/44*
**U.S. Cl. 428—463** **12 Claims**




1. An article of manufacture comprising plasticized polyvinylchloride with a surface coating of a polyester blend of a terpolymer of tetramethylene glycol reacted with terepthalic acid, isopthalic acid, and azelaic acid, and a copolymer of ethylene glycol reacted with terepthalic acid and sebasic acid.

8. An electrical conductor comprising a conductor wire insulated with a material comprising polyvinylchloride and coated with a polyester blend of a terpolymer of tetramethylene glycol reacted with terepthalic acid, isopthalic acid, and azelaic acid, and a copolymer of ethylene glycol reacted with terepthalic acid and sebasic acid.

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**4,166,882**

## METHOD OF COATING WITH AQUEOUS THERMOSETTING ACRYLIC POLYMER LATEX OF UNIFORM PARTICLE SIZE

**Suryya K. Das, Pittsburgh, and Charles M. Kania, Tarentum, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.**

**Filed Apr. 26, 1978, Ser. No. 900,366**
**Int. Cl.[2] B05D** *7/14;* **B32B** *15/08*
**U.S. Cl. 428—463** **3 Claims**

1. In a method of coating a solid substrate which is cured under conditions such that the substrate reaches a temperature of at least 190° C. within 60 seconds with a thermosetting aqueous acrylic polymer latex, the improvement comprising coating said substrate with a stable acrylic polymer latex having an average particle size within the range of 2000 to 3000 Angstrom units and the particle size deviation is ±300 Angstrom units.

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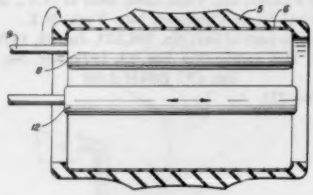
**4,166,883**

## TIRES WITH LINERS CURED BY IRRADIATION

**Theophilus K. Seiberling, Akron, Ohio, assignor to Mildred Kelley Seiberling, Akron, Ohio, a part interest**

**Continuation of Ser. No. 627,136, Oct. 30, 1975, abandoned, which is a continuation of Ser. No. 395,346, Sep. 7, 1973, Pat. No. 3,933,553, which is a continuation of Ser. No. 321,421, Jan. 5, 1973, abandoned, which is a continuation-in-part of Ser. No. 838,512, Jul. 2, 1969, abandoned. This application Mar. 20, 1978, Ser. No. 888,288**
**The portion of the term of this patent subsequent to Jan. 20, 1993, has been disclaimed.**
**Int. Cl.[2] B29H** *5/00*
**U.S. Cl. 428—495** **47 Claims**

1. The method of preparing a pneumatic tire which comprises building up a carcass with or without a tread and providing for the carcass a liner which liner is composed of a material which contains natural rubber and/or synthetic rubber which is curable by electron irradiation, and at least partially curing a portion of the liner by exposure to electron irradiation or other



means of radiation having the same curing effect on the exposed rubber, and completing the tire.

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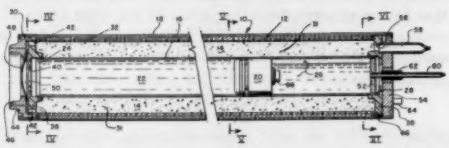
**4,166,884**

## POSITION INSENSITIVE BATTERY

**Joseph F. McCartney, Solana Beach, and William H. Shipman, La Mesa, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Sep. 15, 1978, Ser. No. 942,844**
**Int. Cl.[2] H01M** *6/02*
**U.S. Cl. 429—10** **10 Claims**



1. In a battery having an anode and a cathode, a pair of spaced apart concentric tubes which provide an annular space therebetween, a piston mounted in the inner tube, an electrolyte disposed in the inner tube between one side of the piston and one end of the inner tube, and means disposed in the inner tube between the other side of the piston and the other end of the inner tube for biasing the piston toward said one end of the inner tube, the improvement comprising:

said cathode being porous and being mounted in said annular space;

an electrolyte substantially completely filling the pores of said cathode;

the volume of the electrolyte within the porous cathode being substantially only sufficient for stoichiometry;

passageway means communicating the electrolyte side of the inner tube with said annular space; and

the volume of the electrolyte within the inner tube being substantially only sufficient for filling the voids left within the annular space as the products react,

whereby, regardless of the position of the battery, the anode will be substantially completely reacted.

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**4,166,885**

## PROCESS FOR THE PRODUCTION OF ELECTRIC CURRENT IN AN ELECTROCHEMICAL GENERATOR HAVING AN ANODIC ELECTRON COLLECTOR COMPRISING A PASSIVATING LAYER

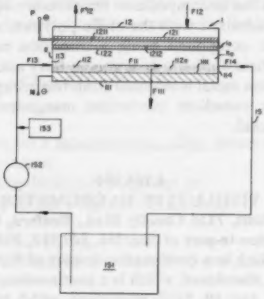
**Pierre Durand, Clermont-Ferrand, France, assignor to Compagnie Generale des Etablissements Michelin, Clermont-Ferrand, France**

**Filed Jan. 30, 1978, Ser. No. 873,367**
**Claims priority, application France, Jan. 31, 1977, 77 03092**
**Int. Cl.[2] H01M** *8/04*
**U.S. Cl. 429—15** **23 Claims**

1. Process for the production of electric current using an electrochemical generator comprising at least one cell with at

least one anode compartment in which there is present, during the production of electric current, a aqueous electrolyte in movement, called primary electrolyte, containing particles formed, at least in part, of an active metallic material, called active particles, said active metallic material being capable of being oxidized electrochemically in the anode compartment with the loss of the electrons collected by at least one anodic electron collector, characterized by the fact that during the production of electric current substantially the entire surface of the anodic electron collector arranged on the primary electrolyte side is formed of a metallic material which is in passivated state, and by the fact that, prior to the production of electric current, said surface is placed in contact with an aqueous electrolyte, called secondary electrolyte, said surface being then brought to a potential less than the equilibrium potential $V_a$ of the electrochemical reaction of the reduction of the water contained in said secondary electrolyte, said reduction reaction liberating hydrogen.

12. Electrochemical generator of electric current comprising at least one cell with at least one anode compartment comprising at least one inlet and one outlet, said compartment



being connected, on the one hand, via its inlet to a feed device and, on the other hand, via its outlet to an evacuation device, said devices making it possible to create, through the compartment during the production of electric current, a flow of an aqueous electrolyte, called primary electrolyte, containing particles formed, at least in part, of an active metallic material, called active particles, said active metallic material being capable of being oxidized electrochemically in the anode compartment with the loss of the electrons collected by at least one anodic electron collector, characterized by the fact that during the production of electric current substantially the entire surface of the anodic electron collector arranged on the primary electrolyte side is formed of a metallic material which is in passivated state, and by the fact that, prior to the production of electric current, said surface is in contact with an aqueous electrolyte, called secondary electrolyte, the generator having means which make it possible then to bring said surface to a potential less than the equilibrium potential $V_a$ of the electrochemical reaction of the reduction of the water contained in said secondary electrolyte, said reduction reaction liberating hydrogen.

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**4,166,886**

## NICKEL-CADMIUM CELL AND METHOD FOR PRECHARGING NEGATIVE ELECTRODE OF NICKEL-CADMIUM ALKALINE STORAGE CELL

**Raymond Bonnaterre, Bordeaux, France, assignor to Saft-Societe des Accumulateurs Fixes et de Traction, Romainville, France**

**Filed Jul. 17, 1978, Ser. No. 925,560**
**Claims priority, application France, Dec. 5, 1977, 77 36500**
**Int. Cl.² H01M *10/34***
**U.S. Cl. 429—60** **10 Claims**

1. A method for precharging the negative electrode of a nickel-cadmium alkaline storage cell having electrodes assembled in an at least partially discharged state, comprising the steps of:

introducing, before the first charge of the cell, a calculated quantity of a material into the cell, said material being irreversibly oxidizable in an alkaline medium at a potential such that it is anodically oxidized before nickel hydroxide without evolving any gas, and then

charging the storage cell until said introduced material is completely oxidized.

7. A nickel-cadmium storage cell having a prechargeable negative electrode, the cell including a nickel positive electrode, a cadmium negative electrode, said electrodes being assembled in the cell in an at least partially discharged state, and an alkaline electrolyte, wherein the improvement comprises:

a calculated quantity of a material added to the cell, said material being irreversibly oxidizable in an alkaline medium at a potential such that it is anodically oxidized before nickel hydroxide without evolving any gas, whereby subsequent charging of the cell will irreversibly completely oxidize said material to create a precharged negative cadmium electrode.

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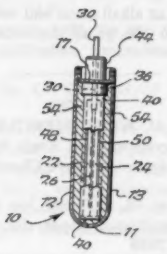
**4,166,887**

## LITHIUM HALOGEN CELL INCLUDING ACTIVATED CHARCOAL

**Max A. Mueller, East Amherst; Robert L. McLean, Clarence; Curtis F. Holmes, East Amherst, and Wilson Greatbatch, Clarence, all of N.Y., assignors to Wilson Greatbatch Ltd., Clarence, N.Y.**

**Filed Jun. 19, 1978, Ser. No. 916,593**
**Int. Cl.² H01M *6/18***
**U.S. Cl. 429—191** **8 Claims**




1. A lithium halogen cell comprising a lithium anode, a solid electrolyte comprising lithium halide, and a cathode comprising a mixture of halogen and activated charcoal, said solid electrolyte being formed in situ between said anode and said cathode.

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**4,166,888**

## CELL HAVING AN ALKALI METAL ANODE, A FLUORINATED CARBON CATHODE AND AN ELECTROLYTE WHICH INCLUDES AN ALKALI METAL HALIDE SALT AND A SOLVENT SYSTEM CONTAINING A SUBSTITUTED AMIDE SOLVENT AND A CYCLIC CARBONATE COSOLVENT

**Baskara M. L. Rao, Fanwood, and Paul A. Malachesky, Berkeley Heights, both of N.J., assignors to Exxon Research & Engineering Co., Florham Park, N.J.**

**Filed Oct. 30, 1978, Ser. No. 955,646**
**Int. Cl.² H01M *6/14***
**U.S. Cl. 429—194** **29 Claims**

1. A current producing cell, comprising:

(a) an anode containing alkali metal as its anode-active material;

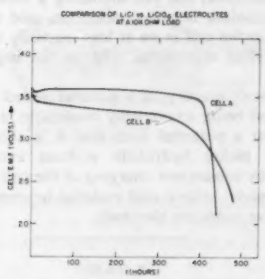
(b) a cathode containing as a cathode-active material a compound of fluorine and carbon; and,

(c) an electrolyte containing:

(i) a mixed solvent system containing about 20 to about 80 percent by volume, based on the total solvent volume, of one or more substituted amides having the formula:

$R_1CONR_2R_3$

wherein $R_1$ is an alkyl radical having 1 to 3 carbon atoms and wherein $R_2$ and $R_3$ may be the same or different and are alkyl radicals having 1 to 4 carbon atoms,




and containing about 80 to about 20 percent by volume, based on the total solvent volume, of one or more cosolvents, at least a part of which is cyclic carbonate cosolvent; and,

(ii) one or more alkali metal halide salts having the formula:

ZX

wherein Z in an alkali metal and wherein X is a halogen selected from the group consisting of chlorine and fluorine.

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**4,166,889**

**SHEET MATERIAL WITH IMPROVED DYEABILITY**

**Toshikazu Fujii, Neyagawa, and Kenji Nakamura, Hirakata, both of Japan, assignors to Sanyo Chemical Industries, Ltd., Kyoto, Japan**

**Filed Jul. 18, 1977, Ser. No. 816,709**

**Claims priority, application Japan, Jul. 30, 1976, 51/91451; Sep. 29, 1976, 51/117589**

**Int. Cl.[2] C08G *18/14, 18/63;* D06P *3/24***

**U.S. Cl. 521—55** **15 Claims**

1. A dyed microporous sheet material which comprises a polyurethane resin formed from a solution in a solvent of a polyurethane resin (A) obtained by reacting an organic diisocyanate with an active hydrogen-containing material comprising a polymer polyol derived from a high-molecular diol wherein the equivalence ratio of the diisocyanate to the active hydrogen-containing material is substantially 1, said sheet material having been dyed with a dye.

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**4,166,890**

**MANUFACTURE OF CROSSLINKED FOAMABLE MOLDINGS FROM OLEFIN POLYMERS**

**Michael Fried, Heidelberg; Ludwig Zuern, Bad Duerkheim, and Erhard Stahnecker, Heidelberg, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Mar. 13, 1978, Ser. No. 885,770**

**Claims priority, application Fed. Rep. of Germany, Apr. 2, 1977, 2714800**

**Int. Cl.[2] C08V *9/10***

**U.S. Cl. 521—92** **17 Claims**

1. A process for the manufacture of a crosslinked, foamable molding from an olefin polymer by

A. mixing a thermoplastic olefin polymer with

(a) from 1 to 20% by weight, based on the olefin polymer, of a solid organic blowing agent which eliminates an inorganic gas of heating, and

(b) from 0.25 to 5% by weight, based on the olefin polymer of an organic peroxide having a half-life temperature above 90° C., with or without

(c) from 0.1 to 10% by weight, based on the olefin polymer of zinc oxide or zinc stearate as a foaming assistant, an organic compound which contains 2 or more olefinically unsaturated double bonds as a crosslinking promoter and/or one or more other additives, at above the softening point of the olefin polymer but below the decomposition temperature of the blowing agent and peroxide,

B. converting the mixture, in the thermoplastic state, to the desired shape, and

C. crosslinking the mixture at below the decomposition temperature of the blowing agent, but above the decomposition temperature of the activated peroxide.

wherein, in stage A,

(d) from 0.00001 to 1% by weight, based on the olefin polymer, of an activating organic compound which lowers the decomposition temperature of the peroxide is also admixed with the olefin polymer, said activating organic compound being a transition metal salt of a long-chain aliphatic or aromatic fatty acid in which the transition metal is selected from the group consisting of copper, vanadium, chromium, manganese, iron, cobalt and nickel.

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**4,166,891**

**VISUAL-TYPE HYGROMETER**

**Stanley B. Elliott, 7125 Conelly Blvd., Bedford, Ohio 44146**

**Continuation-in-part of Ser. No. 547,811, Feb. 7, 1975, abandoned, which is a continuation-in-part of Ser. No. 505,526, Sep. 12, 1974, abandoned, which is a continuation-in-part of Ser. No. 245,494, Apr. 19, 1972, abandoned, which is a division of Ser. No. 18,921, Mar. 12, 1970, abandoned. This application Feb. 2, 1976, Ser. No. 654,087**

**Int. Cl.[2] C08L *1/28, 33/02, 35/06***

**U.S. Cl. 525—329** **14 Claims**

1. The complexes of the alkali metals salts of 3,3',4,4' benzophenone tetracarboxylic acid in which the alkali metal salt is complexed with from 0.5 to 25.0 mol percent of the metals present of a water-soluble salt of a polyvalent metal cation selected from the group $Cu^{++}$, $Be^{++}$, $Mg^{++}$, $Ca^{++}$, $Sr^{++}$, $Ba^{++}$, $Zn^{++}$, $Cd^{++}$, $Al^{+++}$, $Cr^{++}$, $Mn^{++}$, $Co^{++}$, and $Ni^{++}$ and in which each 15% of alkali metal salt is complexed with from 2 to 10% by weight of a polymer which has repetitive carboxyl groups whose acidic hydrogens have been replaced by alkali metal cations.

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**4,166,892**

**PROCESS FOR VULCANIZING RUBBER AT A LOW TEMPERATURE**

**Isamu Maeda, and Masashi Aoshima, both of Ichihara, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan**

**Continuation of Ser. No. 655,547, Feb. 5, 1976, abandoned, which is a continuation of Ser. No. 429,588, Jan. 2, 1974, abandoned. This application Jul. 12, 1977, Ser. No. 814,918**

**Claims priority, application Japan, Jan. 12, 1973, 48/6805**

**Int. Cl.[2] C08J *3/24;* C08K *5/14;* C08L *7/00, 15/02***

**U.S. Cl. 525—373** **5 Claims**

1. A process for vulcanizing a non-aqueous chloroprene rubber base comprising chloroprene rubber at a low temperature consisting essentially of

vulcanizing said non-aqueous chloroprene rubber base at a temperature ranging from 5° to 85° C. in the presence of 0.01 to 20 parts by weight of at least one vulcanizing agent selected from the group consisting of an organic hydroperoxide and ketone peroxide per 100 parts by weight of said chloroprene rubber, and

0.01 to 20 parts by weight of at least one vulcanization activator or accelerator selected from the group consisting of oxides of zinc, lead, chromium, cobalt, nickel, magnesium, manganese, copper, and iron per 100 parts by weight of said chloroprene rubber.

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**4,166,893**

## HYDROXY UNSATURATED DIESTERS AND COPOLYMERS THEREOF

**Stamatis M. Kambanis; Alan D. Roberts, and Walter Schank, all of Downsview, Canada, assignors to Reichhold Chemicals Limited, Islington, Canada**

**Continuation-in-part of Ser. No. 630,904, Nov. 11, 1975, abandoned. This application Oct. 3, 1977, Ser. No. 838,863**
**Claims priority, application Canada, Nov. 26, 1974, 214705**
**Int. Cl.[2] C08F** *218/14, 218/16*
**U.S. Cl. 526—75** **12 Claims**

1. A copolymer capable of cross linking to provide a thermosetting system, characterised in that the copolymer consists of monomers of the following three classes, in the weight percentages given:

(A) from 11% to 30% of an ester mixture consisting of at least 70% by weight of an unsaturated diester of formula (I)

$$R_1—O_2—CH=CH—CO_2—R_2 \quad (I)$$

wherein:

$R_1$ represents (a) a monohydroxy alkyl group of two to six carbon atoms; or

(b) a 2,3-dihydroxypropyl group; or

(c) a group of the empirical formula (I)

$$+(CH_2)_nO]_m[—(CH_2)_x+OH \quad (II)$$

in which formula n=2 or 3; x=2 or 3, and m is from 1 to 800; and

$R_2$ represents a linear or branched primary alkyl group having from 4 to 12 carbon atoms;

which ester mixture has been prepared by reacting together 1.0 mole of a polyol of formula $R_1OH$, 1.1 moles of a primary alcohol of formula $R_2OH$ and 1 mole of an acid of formula $HO_2C—CH=CH—CO_2H$, or 1 mole of the anhydride thereof, in the presence of para-toluene sulphonic acid as catalyst;

(B) from 2% to 35% of an alkyl acrylate, having up to eight carbon atoms in the alkyl group, which group may be of linear or branched configuration; and

(C) from 35% to 87% of at least one other monomer containing olefinic unsaturation, and chosen from the group consisting of methyl methacrylate, acrylic acid, vinyl acetate, and styrene.

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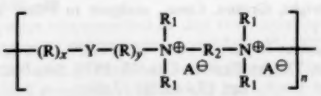
**4,166,894**

## FUNCTIONAL IONENE COMPOSITIONS AND THEIR USE

**Raymond J. Schaper, Pittsburgh, Pa., assignor to Calgon Corporation, Pittsburgh, Pa.**

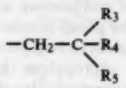
**Division of Ser. No. 676,777, Apr. 14, 1976, Pat. No. 4,075,136, which is a continuation-in-part of Ser. No. 436,419, Jan. 25, 1974, abandoned. This application Nov. 17, 1977, Ser. No. 852,406**
**Int. Cl.[2] C08G** *73/00*
**U.S. Cl. 528—271** **1 Claim**

1. A polymer composition represented by the formula:



wherein R is independently selected from the group $CH_2$ and substituted $CH_2$ groups where one of the hydrogen atoms of the group is replaced by alkyl or hydroxymethyl; wherein Y is

wherein $R_1$ represents the group



where $R_3$ is hydrogen, lower alkyl of from 1 to 4 carbon atoms, or lower alkenyl of from 1 to 4 carbon atoms; $R_4$ is hydrogen, halogen, straight or branched alkyl, cycloalkyl, aryl, alkaryl, or aralkyl; and

where $R_5$ is an acyclic amide containing an amide group;

wherein $R_2$ is a straight or branched alkyl chain of 1 to 18 carbon atoms, which may be interrupted by one or more atoms of oxygen or sulfur, aralkyl or cycloalkyl;

wherein $A\ominus$ is an anion; and

wherein x and y are integers from 1 to 10; and n is an integer of 2 or greater.

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**4,166,895**

## COPOLYESTER FROM 1,4-BUTANEDIOL AND A DICARBOXYLIC ACID MIXTURE

**Lothar Buxbaum, Lindenfels, Fed. Rep. of Germany, and Rolf Hugi, Ramlinsburg, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Filed May 15, 1978, Ser. No. 905,624**
**Claims priority, application Switzerland, May 18, 1977, 6210/77**
**Int. Cl.[2] C08G** *63/18*
**U.S. Cl. 528—272** **5 Claims**

1. A copolyester which has a relative viscosity of at least 2.2, measured on a solution of 1 gram of polyester in 100 ml of a solvent consisting of equal parts of phenol and symmetrical tetrachloroethane at 30° C., which comprises the condensation product in about a 1:1 molar ratio of diacids (a), (b) and (c) with 1,4-butanediol (d) so that the composition of the polyester comprises

in the diacid component of the polyester

(a) from 8 to 12 mol %, based on the total polyester, of radicals of sebacic acid or of radicals from an amount equal by weight of a saturated dicarboxylic acid having 6 to 36 carbon atoms;

(b) from 26 to 32 mol %, based on the total polyester, of radicals of terephthalic acid; and

(c) from 7.5 to 12 mol %, based on the total polyester, of radicals of isophthalic acid; and

in the diol component of the polyester

(d) 50 mol %, based on the total polyester, of radicals of 1,4-butanediol; wherein the radicals (a), (b) and (c) are attached to radicals (d) through ester linkages in a random distribution.

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**4,166,896**

## POLYESTER PRODUCTION

**Kenneth N. Warner, Jr., Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio**

**Continuation of Ser. No. 660,100, Feb. 23, 1976, abandoned, and a continuation-in-part of Ser. No. 544,453, Jan. 27, 1975, abandoned. This application Jun. 22, 1977, Ser. No. 808,848**
**Int. Cl.[2] C08G** *63/56*
**U.S. Cl. 528—301** **5 Claims**

1. A method for producing an unsaturated polyester resin

from a mixture of glycols and oligomers, said mixture having a hydroxyl number of about 250 to 1000 and comprising a waste stream from the production of polyethylene terephthalate, where said glycols in said mixture are selected from the group consisting of ethylene glycol, diethylene glycol and diesters of terephthalic acid with ethylene glycol and/or diethylene glycol and where said oligomers in said mixture are low molecular weight polyesters of terephthalic acid with ethylene glycol or with both ethylene glycol and diethylene glycol which contain about two to four terephthalic acid residues per molecular, said method comprising the steps of:

(a) forming a blend of said mixture with a polyhydric alcohol selected from the group consisting of ethylene glycol, diethylene glycol, triethylene glycol, polyethylene glycol, propylene glycol, dipropylene glycol, polypropylene glycol, glycerol, neopentyl glycol, pentaerythritol, trimethylol propane, trimethylol ethane, 1,3-butylene glycol and 1,4-butylene glycol;

(b) transesterifying said blend at a temperature of 170° C. to 235° C. and a pressure of up to 60 psi for 2 to 24 hours;

(c) adding an ethylenically unsaturated dicarboxylic acid to the transesterified blend; and

(d) further reacting the transesterified blend containing said added acid to reduce the acid number below about 35.

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**4,166,897**

## PHOSPHORUS-CONTAINING CONDENSATION PRODUCTS, THEIR PRODUCTION AND THEIR USE AS FLAME RETARDANTS

**Kohei Umetani; Masakazu Date, both of Takatsuki, and Kiyonori Kawai, Toyama, all of Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan**

**Filed Aug. 2, 1976, Ser. No. 710,856**

**Claims priority, application Japan, Aug. 5, 1975, 50-95573**

**Int. Cl.[2] C08G *79/06***

**U.S. Cl. 528—398** **13 Claims**

1. A process for producing a water-soluble phosphorus-containing condensation product having a molar ratio P—$CH_2$—P linkage/P—$CH_2OCH_2$—P linkage of 0.8–4.0, which comprises heating a tetrakis(hydroxymethyl)phosphonium compound under acid conditions at a temperature exceeding 150° C. and a pressure below 100 mm Hg to condense said phosphonium compound by dehydration and deformaldehydation reaction.

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**4,166,898**

## PROCESS FOR PRODUCING COPOLYMER HAVING CARBONATE LINKAGES

**Masaki Kambe, Fujisawa; Tadamichi Takada, Yokohama; Nobuyuki Miyazaki; Masanori Yokokawa, both of Fujisawa, and Shohei Inoue, Tokyo, all of Japan, assignors to Nippon Oil Seal Industry Company Ltd., Tokyo, Japan**

**Continuation of Ser. No. 527,919, Nov. 27, 1974, abandoned. This application Nov. 11, 1976, Ser. No. 740,918**

**Claims priority, application Japan, Mar. 18, 1974, 49-30099; Mar. 18, 1974, 49-30100**

**Int. Cl.[2] C08G *63/62, 65/26***

**U.S. Cl. 528—405** **8 Claims**

1. In the known process of producing copolymers having a carbonate linkage by copolymerizing an epoxy compound with carbon dioxide in the presence of a catalyst, the improvement which comprises:

using as said catalyst a copolymerization catalyst consisting of a carbon dioxide treated isoprene-magnesium complex, and

carrying out the catalytic copolymerization process at a temperature from room temperature to about 150° C. and under a pressure of from atmospheric pressure to about 100 $kg/cm^2$.

**4,166,899**

## ISOLATION OF AROMATIC POLYESTER COPOLYMERS

**Takashi Maruyama, Toyonaka, and Katsuji Ueno, Hirakata, both of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan**

**Filed Dec. 3, 1976, Ser. No. 747,060**

**Claims priority, application Japan, Dec. 5, 1975, 50-145428**

**Int. Cl.[2] C08G *63/18, 63/70, 63/72, 63/74***

**U.S. Cl. 528—480** **6 Claims**

1. A method for the production of aromatic polyesters of a uniform and fine powder, which comprises:

mixing an aqueous alkaline solution of 2,2-bis(4'-hydroxyphenyl) propane with a 1,2-dichloroethane solution of a mixture of terephthaloyl chloride and isophthaloyl chloride with stirring to obtain a mixture containing an aromatic polyester copolymer;

subjecting the mixture to liquid-liquid phase separation;

washing the thus separated 1,2-dichloroethane solution containing the aromatic polyester copolymer using methanol or a methanol-containing aqueous solution as a washing liquid, said separated 1,2-dichloroethane solution having a water content of less than 50% by weight based on 1,2-dichloroethane, the amount of methanol being in the range of 5 to 95% by weight based on the total amount of said washing liquid and water contained in the separated 1,2-dichloroethane solution before washing;

mixing the 1,2-dichloroethane solution thus washed with 0.01 to 1.0 time by volume, based on said solution, of methanol, said 1,2-dichloroethane solution containing 8 to 50% by weight of the aromatic polyester copolymer; and

isolating the resulting precipitates.

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**4,166,900**

## PREPARATION OF REFINED OLEFIN/MALEIC ACID COPOLYMERS

**Robert A. Heimsch, St. Louis, and John H. Johnson, Kirkwood, both of Mo., assignors to Monsanto Company, St. Louis, Mo.**

**Filed Dec. 23, 1977, Ser. No. 863,759**

**Int. Cl.[2] C08F *6/12, 222/02*; A61K *31/19***

**U.S. Cl. 528—491** **19 Claims**

1. A method of refining α-olefin/maleic acid copolymer in which the olefin is a higher olefin, which comprises selectively precipitating such copolymer from solution with dichloroethane.

17. A refined pharmaceutical grade higher α-olefin/maleic acid copolymer of high molecular weight with heterogeneous molecular weight distribution characterized by the low amount present of low molecular weight polymer removable by functional precipitation from solution and less than 0.1% of molecules of less than 2000 molecular weight and no more than 400 parts per million of α-olefin or maleic acid content.

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**4,166,901**

## 4''-DEOXY-4''-ARYLGLYOXAMIDO- AND AROYLTHIOFORMAMIDO DERIVATIVES OF OLEANDOMYCIN AND ITS ESTERS

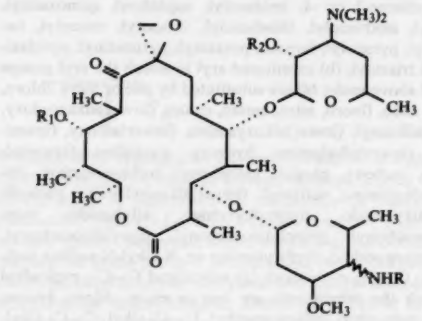
**Gene M. Bright, Groton, Conn., assignor to Pfizer Inc., New York, N.Y.**

**Continuation-in-part of Ser. No. 866,890, Jan. 3, 1978, abandoned. This application Oct. 23, 1978, Ser. No. 952,411**

**Int. Cl.[2] C07H *17/08***

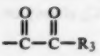
**U.S. Cl. 536—9** **32 Claims**

1. A compound having the formula



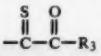
and the pharmaceutically acceptable acid addition salts thereof wherein

R is selected from the group consisting of



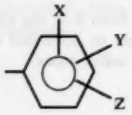
(a)

and



(b)

wherein $R_3$ is selected from the group consisting of a first subgroup consisting of



a second subgroup consisting of: heterocyclyl

and a third subgroup consisting of: alkyl having from one to four carbon atoms;

wherein each of X and Y is selected from the group consisting of hydrogen, chloro, bromo, fluoro, alkyl having from one to four carbon atoms and alkoxy having from one to four carbon atoms; and Z is selected from the group consisting of X, dimethylamino, nitro and amino;

heterocyclyl is selected from the group consisting of thienyl, furyl and pyridyl;

and each of $R_1$ and $R_2$ is selected from the group consisting of hydrogen and alkanoyl having from two to three carbon atoms.

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**4,166,902**

**HIGH POLYMERS CONTAINING NICOTINIC ACID, PROCESS FOR THEIR PREPARATION AND THEIR USE**

**Paolo Ferruti, V.le Cassiodoro, 24, and Rodolfo Paoletti, V.le Regina Margherita, 43, both of Milan, Italy**

**Continuation-in-part of Ser. No. 622,442, Oct. 14, 1975, Pat. No. 4,067,876. This application Jan. 9, 1978, Ser. No. 867,889**

**Claims priority, application Italy, Oct. 14, 1974, 28420 A/74**

**Int. Cl.[2] C08F *31/02***

**U.S. Cl. 536—48** **5 Claims**

1. Polymers characterized in that they consist of a soluble starch macromolecular structure to which 15–30% by weight of nicotinic acid radicals are bound through covalent ester bonds, which polymers are gradually hydrolyzed in biological evironment by setting free nicotinic acid and non-toxic polysaccharide residues.

**4,166,903**

**5-HYDROXY-PGI$_1$ PYRROLIDYLAMIDES**

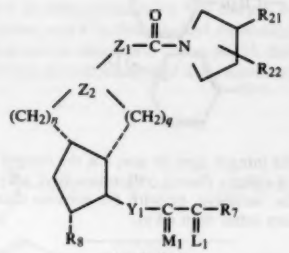
**Roy A. Johnson, and John C. Sih, both of Kalamazoo, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.**

**Continuation-in-part of Ser. No. 815,648, Jul. 14, 1977, Pat. No. 4,110,532. This application Apr. 24, 1978, Ser. No. 899,198**

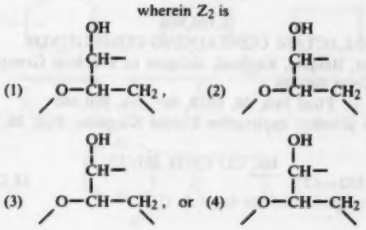
**Int. Cl.[2] C07D *405/06, 405/02***

**U.S. Cl. 542—426** **38 Claims**

1. A prostacyclin analog of the formula



wherein $Z_2$ is



wherein one of p or q is the integer zero or one and the other is the integer zero;

wherein $Z_1$ is

(1) $-(CH_2)_g-CH_2-CH_2-$,

(2) $-(CH_2)_g-CH_2-CF_2-$, or

(3) trans-$(CH_2)_g-CH=CH-$,

wherein g is the integer one, 2, or 3 when q is zero and zero, one, or 2 when q is one;

wherein $R_8$ is hydrogen, hydroxy, or hydroxymethyl;

wherein $Y_1$ is

(1) trans-CH=CH—,

(2) cis-CH=CH—,

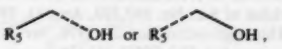
(3) $-CH_2CH_2-$,

(4) trans-CH=C(Hal)—, or

(5) —C≡C—

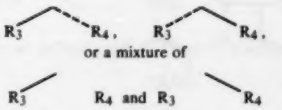
wherein Hal is chloro or bromo;

wherein $M_1$ is



wherein $R_5$ is hydrogen or alkyl with one to 4 carbon atoms, inclusive;

wherein $L_1$ is



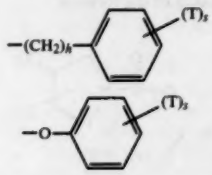
wherein $R_3$ and $R_4$ are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of $R_3$ and $R_4$ is fluoro only when the other is hydrogen or fluoro;

wherein $R_{21}$ and $R_{22}$ are hydrogen, alkyl of one to 12 carbon

atoms, inclusive; aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, 2, or 3 chloro or alkyl of one to 3 carbon atoms, inclusive, or phenyl substituted with hydroxycarbonyl or alkoxycarbonyl of one to 4 carbon atoms, inclusive; and

wherein $R_7$ is

(1) $-(CH_2)_3-CH_3$,



(2)



(3)

wherein h is the integer zero or one; s is the integer zero, one, 2, or 3; and T is chloro, fluoro, trifluoromethyl, alkyl of one to 3 carbon atoms, inclusive, or with the proviso that not more than two T's are other than alkyl.

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**4,166,904**

**β-LACTAM CONTAINING COMPOUNDS**

**Eric Hunt, Reigate, England, assignor to Beecham Group Limited, Great Britain**

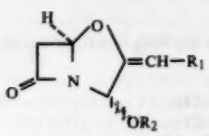
**Filed Feb. 24, 1978, Ser. No. 880,948**

**Claims priority, application United Kingdom, Feb. 26, 1977, 8240/77**

**Int. Cl.[2] C07D *263/52***

**U.S. Cl. 542—427** **14 Claims**

1. A compound of the formula (II)



(II)

wherein $R_1$ is $CH_3$, $CH_2OH$, CHO or $CH_2OCOR_4$ wherein $R_4$ is a hydrocarbon of 1–7 carbon atoms and $R_2$ is a group of the formula $R_3$ or $COR_3$ wherein $R_3$ is a hydrocarbon of 1–7 carbon atoms unsubstituted or substituted by halogen.

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**4,166,905**

**O-2-ISOCEPHEM-4-CARBOXYLIC ACID DERIVATIVES AS ANTIBACTERIAL AGENTS**

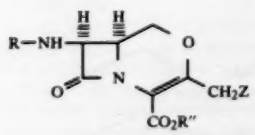
**Marcel Ménard; Gary M. F. Lim, both of Candiac, and Terry T. Conway, Brossard, all of Canada, assignors to Bristol-Myers Company, New York, N.Y.**

**Division of Ser. No. 759,710, Jan. 17, 1977, Pat. No. 4,112,230, which is a division of Ser. No. 567,323, Apr. 11, 1975, Pat. No. 4,011,216. This application Jun. 22, 1978, Ser. No. 918,734**

**Int. Cl.[2] C07D *265/34***

**U.S. Cl. 544—105** **22 Claims**

1. A compound having the formula



wherein R is an acyl group of the formula

$$R^aC_nH_{2n}CO- \quad \text{(i)}$$

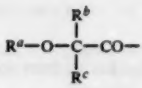
wherein $R^a$ is (a) aryl selected from the group consisting of phenyl, 2-thienyl, 3-thienyl, furyl, 4-isoxazolyl, pyridyl, tetrazolyl, sydnone-3 or -4, imidazolyl, naphthoyl, quinoxalinyl, triazolyl, isothiazolyl, thiadiazolyl, thiazolyl, oxazolyl, oxadiazolyl, pyrazolyl, furazan, pyrazinyl, pyrimidinyl, pyridazinyl and triazinyl; (b) substituted aryl in which the aryl groups defined above under (a) are substituted by one or more chloro, bromo, iodo, fluoro, nitro, amino, cyano, (lower)alkanoyloxy, (lower)alkanoyl, (lower)alkoxyamino, (lower)alkoxy, (lower-)alkyl, (lower)alkylamino, hydroxy, guanidino, (lower)alkylthio, carboxy, phenyl, halophenyl, trifluoromethyl, di(lower)alkylamino, sulfamyl, (lower)alkanoylamino, phenyl(lower)alkylamido, cycloalkylamino, allylamido, morpholinocarbonyl, pyrrolidinocarbonyl, piperidinocarbonyl, tetrahydropyridino, furfurylamido or N-alkyl-N-anilino radicals; (c) $C_3$–$C_{12}$ cycloalkyl; (d) substituted $C_3$–$C_{12}$ cycloalkyl in which the substituents are one or more chloro, bromo, fluoro, iodo, nitro, trifluoromethyl, $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkylamino, $C_1$–$C_2$ alkoxy or amino radicals; (e) $C_3$–$C_{12}$ cycloalkenyl, said cycloalkenyl group having 1 or 2 double bonds; or (f) substituted $C_3$–$C_{12}$ cycloalkenyl, said cycloalkenyl group having 1 or 2 double bonds and being substituted by one or more chloro, bromo, fluoro, iodo, nitro, trifluoromethyl, $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkylamino, $C_1$–$C_2$ alkoxy or amino radicals; and n is an integer from 1–4;

$$C_nH_{2n+1}CO- \quad \text{(ii)}$$

wherein n is an integer from 1–7, the alkyl portion of said acyl group being straight or branched and optionally interrupted by an oxygen or sulfur atom;

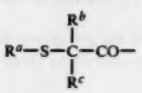
$$C_nH_{2n-1}CO- \quad \text{(iii)}$$

wherein n is an integer from 2–7, the alkenyl portion of said acyl group being straight or branched and optionally interrupted by an oxygen or sulfur atom;



(iv)

wherein $R^a$ is as defined above under (i) and in addition may be benzyl, $C_1$–$C_6$ alkyl or (lower)alkoxy carbonyl and $R^b$ and $R^c$ which may be the same or different each represent hydrogen, phenyl, benzyl, phenethyl or $C_1$–$C_6$ alkyl;



(v)

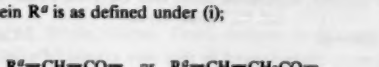
wherein $R^a$ is as defined above under (i) and in addition may be benzyl or $C_1$–$C_6$ alkyl and $R^b$ and $R^c$ are as defined under (iv);

$$R^aX(CH_2)_mCO- \quad \text{(vi)}$$

wherein $R^a$ is as defined under (i) and in addition may be benzyl; X is oxygen or sulfur; and m is an integer of 2–5;

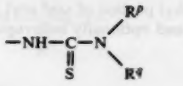
$$R^aCO- \quad \text{(vii)}$$

wherein $R^a$ is as defined under (i);

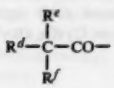


(viii)

wherein $R^a$ is as defined under (i) and Y is hydrazino, guanidino, uredio; substituted ureido of the formula

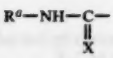


in which $R^p$ is hydrogen or $C_1$–$C_8$ alkyl and $R^q$ is hydrogen, $C_1$–$C_8$ alkyl, $C_2$–$C_8$ alkenyl, phenyl, benzoyl, $C_1$–$C_8$ alkoxy $C_1$–$C_8$ alkyl or (carbo-$C_1$–$C_8$ alkoxy)$C_1$–$C_8$ alkyl; allophanamido; 3-guanyl-1-ureido; 3-(2-furoyl)ureido; 3-(benzoyl-)ureido; cyano; cyanamino; azido; amino; a group obtained by reacting the amino group Y with acetone, formaldehyde, acetaldehyde, butyraldehyde, acetylacetone, methyl acetoacetate, benzaldehyde, salicylaldehyde, methyl ethyl ketone or ethyl acetoacetate; hydroxy; (lower)alkoxy; carboxy; 5-indanyloxycarbonyl; triazolyl; tetrazolyl; halogeno; formyloxy; (lower-)alkanoyloxy; sulfo; or sulfoamino;



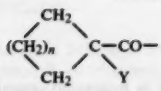
(ix)

wherein $R^d$, $R^e$ and $R^f$ which may be the same or different may each represent $C_1$–$C_6$ alkyl, phenyl or phenyl substituted by one or more chloro, bromo, iodo, fluoro, trifluoromethyl, nitro, amino, cyano, (lower)alkanoyloxy, (lower)alkanoyl, (lower)alkoxyamino, (lower)alkoxy, (lower)alkyl, (lower)alkylamino, hydroxy, (lower)alkylthio, carboxy, di(lower)alkylamino or sulfamyl radicals;



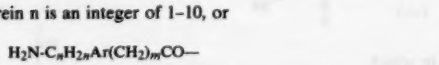
(x)

wherein $R^a$ is as defined under (i) and in addition may be hydrogen, $C_1$–$C_6$ alkyl, halogen-substituted $C_1$–$C_6$ alkyl, phenethyl, phenoxymethyl, benzyl or $R^a$—CO— and X is oxygen or sulfur;



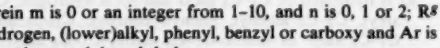
(xi)

wherein Y is as defined under (viii) and n is an integer of 1–4;



(xii)

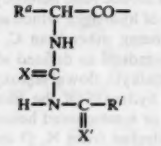
wherein n is an integer of 1–10, or



wherein m is 0 or an integer from 1–10, and n is 0, 1 or 2; $R^g$ is hydrogen, (lower)alkyl, phenyl, benzyl or carboxy and Ar is p-phenylene or 1,4-naphthylene;

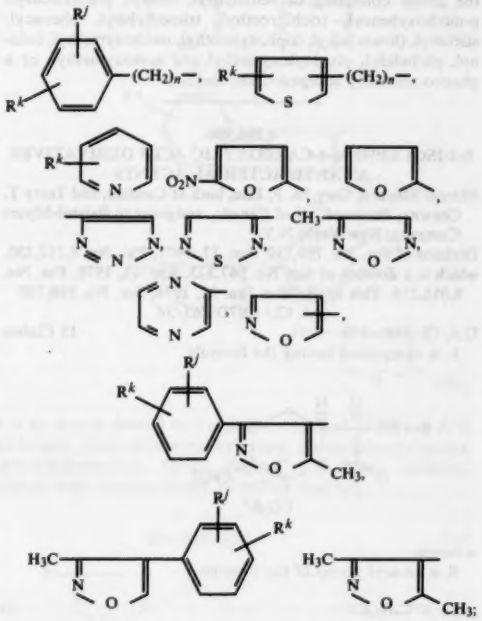
(xiii)

wherein $R^h$ is 2-thienyl; 3-thienyl; α-naphthyl; 2-phenanthryl or a mono-, di- or tri-substituted phenyl group, the substituents being chloro, bromo, iodo, fluoro, amino, di(lower)alkylamino, (lower)alkyl, (lower)alkoxy, nitro or (lower)alkanoylamino;

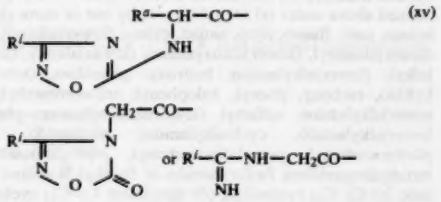


(xiv)

wherein $R^a$ is as defined under (i); X is oxygen or sulfur; X′ is oxygen or imino; and $R^i$ is (lower)alkyl, cycloalkyl having 4, 5, 6 or 7 carbon atoms, monohalo (lower)alkyl, dichloromethyl, trichloromethyl, (lower)alkenyl of 2–6 carbon atoms,

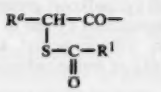


n is an integer from 0 to 3 inclusive and each of $R^k$ and $R^l$ is hydrogen, nitro, di(lower)alkylamino, (lower)alkanoylamino, (lower)alkanoyloxy, $C_1$–$C_6$ alkyl, $C_1$–$C_6$ alkoxy, sulfamyl, chloro, iodo, bromo, fluoro, or trifluoromethyl;



(xv)

wherein $R^a$ is as defined under (i) and $R^i$ is as defined under (xiv); or



(xvi)

wherein $R^a$ is as defined under (i) and $R^1$ is (lower)alkyl, cycloalkyl of 3–12 carbon atoms, phenyl, a monocyclic heterocyclic radical having 5 or 6 atoms exclusive of hydrogen which are C, S, N or O, no more than 2 atoms being other than C, or a substituted monocyclic heterocyclic radical as defined above having one or more halo, (lower)alkyl, (lower)alkoxy or phenyl substituents, Z is etherified hydroxyl of the formula $-OR^3$ in which $R^3$ is benzyl or a 5- or 6-membered heterocyclic radical containing 1–4 atoms selected from N, O and S, said heterocyclic radical being optionally substituted by one or more substituents selected from halogen, amino, nitro, $C_1$–$C_4$ alkyl, $C_3$–$C_4$ cycloalkyl, $C_1$–$C_4$ alkoxy, $C_2$–$C_4$ alkenyl, trifluoromethyl, phenyl, benzyl, $C_1$–$C_4$ alkylthio, $C_1$–$C_4$ alkylamino, di $C_1$–$C_4$ alkylamino or alkoxyalkyl of up to 4 carbon atoms and R'' is hydrogen or an easily cleavable ester selected from the group consisting of benzhydryl, benzyl, p-nitrobenzyl, p-methoxybenzyl, trichloroethyl, trimethylsilyl, phenacyl, acetonyl, (lower)alkyl, triphenylmethyl, methoxymethyl, indanyl, phthalidyl, pivaloyloxymethyl and acetoxymethyl, or a pharmaceutically acceptable salt thereof.

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## 4,166,906
## 0-2-ISOCEPHEM-4-CARBOXYLIC ACID DERIVATIVES AS ANTIBACTERIAL AGENTS

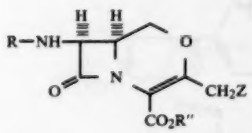
**Marcel Ménard; Gary M. F. Lim, both of Candiac, and Terry T. Conway, Brossard, all of Canada, assignors to Bristol-Myers Company, New York, N.Y.**

**Division of Ser. No. 759,710, Jan. 17, 1977, Pat. No. 4,112,230, which is a division of Ser. No. 567,323, Apr. 11, 1975, Pat. No. 4,011,216. This application Jun. 22, 1978, Ser. No. 918,735**

**Int. Cl.**[2] **C07D** *265/34*

**U.S. Cl. 544—105** **15 Claims**

1. A compound having the formula



wherein

R is an acyl group of the formula

$$R^aC_nH_{2n}CO- \quad \text{(i)}$$

wherein $R^a$ is (a) aryl selected from the group consisting of phenyl, 2-thienyl, 3-thienyl, furyl, 4-isoxazolyl, pyridyl, tetrazolyl, sydnone-3 or -4, imidazolyl, naphthoyl, quinoxalinyl, triazolyl, isothiazolyl, thiadiazolyl, thiazolyl, oxazolyl, oxadiazolyl, pyrazolyl, furazan, pyrazinyl, pyrimidinyl, pyridazinyl and triazinyl; (b) substituted aryl in which the aryl groups defined above under (a) are substituted by one or more chloro, bromo, iodo, fluoro, nitro, amino, cyano, (lower)alkanoyloxy, (lower)alkanoyl, (lower)alkoxyamino, (lower)alkoxy, (lower)alkyl, (lower)alkylamino, hydroxy, guanidino, (lower)alkylthio, carboxy, phenyl, halophenyl, trifluoromethyl, di(lower)alkylamino, sulfamyl, (lower)alkanoylamino, phenyl(lower)alkylamido, cycloalkylamino, allylamido, morpholinocarbonyl, pyrrolidinocarbonyl, piperidinocarbonyl, tetrahydropyridino, furfurylamido or N-alkyl-N-anilino radicals; (c) $C_3$–$C_{12}$ cycloalkyl; (d) substituted $C_3$–$C_{12}$ cycloalkyl in which the substituents are one or more chloro, bromo, fluoro, iodo, nitro, trifluoromethyl, $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkylamino, $C_1$–$C_2$ alkoxy or amino radicals; (e) $C_3$–$C_{12}$ cycloalkenyl, said cycloalkenyl group having 1 or 2 double bonds; or (f) substituted $C_3$–$C_{12}$ cycloalkenyl, said cycloalkenyl group having 1 or 2 double bonds and being substituted by one or more chloro, bromo, fluoro, iodo, nitro, trifluoromethyl, $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkylamino, $C_1$–$C_2$ alkoxy or amino radicals; and n is an integer from 1–4;

$$C_nH_{2n+1}CO- \quad \text{(ii)}$$

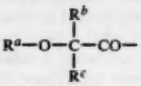
wherein

n is an integer from 1–7, the alkyl portion of said acyl group being straight or branched and optionally interrupted by an oxygen or sulfur atom;

$$C_nH_{2n-1}CO- \quad \text{(iii)}$$

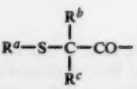
wherein

n is an integer from 2–7, the alkenyl portion of said acyl group being straight or branched and optionally interrupted by an oxygen or sulfur atom;

 (iv)

wherein

$R^a$ is as defined above under (i) and in addition may be benzyl, $C_1$–$C_6$ alkyl or (lower)alkoxy carbonyl and $R^b$ and $R^c$ which may be the same or different each represent hydrogen, phenyl, benzyl, phenethyl or $C_1$–$C_6$ alkyl;

 (v)

wherein

$R^a$ is as defined above under (i) and in addition may be benzyl or $C_1$–$C_6$ alkyl and $R^b$ and $R^c$ are as defined under (iv);

$$R^aX(CH_2)_mCO- \quad \text{(vi)}$$

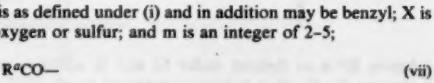
wherein

$R^a$ is as defined under (i) and in addition may be benzyl; X is oxygen or sulfur; and m is an integer of 2–5;

$$R^aCO- \quad \text{(vii)}$$

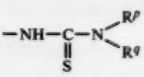
wherein

$R^a$ is as defined under (i);

 (viii)

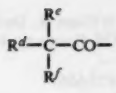
wherein

$R^a$ is as defined under (i) and Y is hydrazino, guanidino, ureido; substituted ureido of the formula



in which

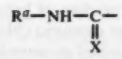
$R^p$ is hydrogen or $C_1$–$C_8$ alkyl and $R^q$ is hydrogen, $C_1$–$C_8$ alkyl, $C_2$–$C_8$ alkenyl, phenyl, benzoyl, $C_1$–$C_8$ alkoxy-$C_1$–$C_8$ alkyl or (carbo-$C_1$–$C_8$ alkoxy)$C_1$–$C_8$ alkyl; allophanamido; 3-guanyl-1-ureido; 3-(2-furoyl)ureido; 3-(benzoyl)ureido; cyano; cyanamino; azido; amino; a group obtained by reacting the amino group Y with acetone, formaldehyde, acetaldehyde, butyraldehyde, acetylacetone, methyl acetoacetate, benzaldehyde, salicylaldehyde, methyl ethyl ketone or ethyl acetoacetate; hydroxy; (lower)alkoxy; carboxy; 5-indanyloxycarbonyl; triazolyl; tetrazolyl; halogeno; formyloxy; (lower)alkanoyloxy; sulfo; or sulfoamino;



(ix)

wherein

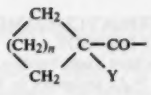
$R^d$, $R^e$ and $R^f$ which may be the same or different may each represent $C_1$–$C_6$ alkyl, phenyl or phenyl substituted by one or more chloro, bromo, iodo, fluoro, trifluoromethyl, nitro, amino, cyano, (lower)alkanoyloxy, (lower)alkanoyl, (lower)alkoxyamino, (lower)alkoxy, (lower)alkyl, (lower-)alkylamino, hydroxy, (lower)alkylthio, carboxy, di(-lower)alkylamino or sulfamyl radicals;



(x)

wherein

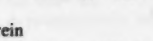
$R^a$ is as defined under (i) and in addition may be hydrogen, $C_1$–$C_6$ alkyl, halogen-substituted $C_1$–$C_6$ alkyl, phenethyl, phenoxymethyl, benzyl or $R^a$—CO— and X is oxygen or sulfur;



(xi)

wherein

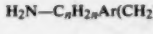
Y is as defined under (viii) and n is an integer of 1–4;



(xii)

wherein

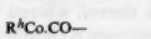
n is an integer of 1–10, or



wherein

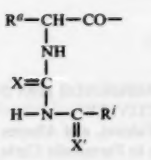
m is 0 or an integer from 1–10, and n is 0, 1 or 2;

$R^g$ is hydrogen, (lower)alkyl, phenyl, benzyl or carboxy and Ar is p-phenylene or 1,4-naphthylene;



(xiii)

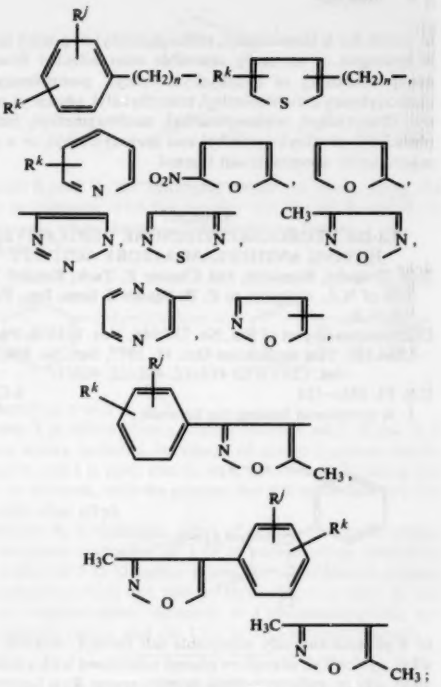
wherein $R^h$ is 2-thienyl; 3-thienyl; α-naphthyl; 2-phenanthryl or a mono-, di- or tri-substituted phenyl group, the substituents being chloro, bromo, iodo, fluoro, amino, di(lower)alkylamino, (lower)alkyl, (lower)alkoxy, nitro or (lower)alkanoylamino;



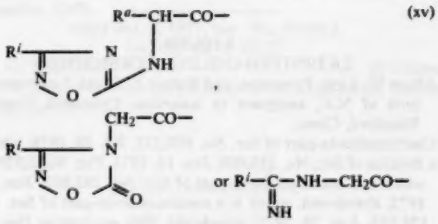
(xiv)

wherein

$R^a$ is as defined under (i); X is oxygen or sulfur; X' is oxygen or imino; and $R^i$ is (lower)alkyl, cycloalkyl having 4, 5, 6 or 7 carbon atoms, monohalo(lower)alkyl, dichloromethyl, trichloromethyl, (lower)alkenyl of 2–6 carbon atoms,



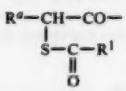
n is an integer from 0 to 3 inclusive and each of $R^k$ and $R^j$ is hydrogen, nitro, di(lower)alkylamino, (lower)alkanoylamino, (lower)alkanoyloxy, $C_1$–$C_6$ alkyl, $C_1$–$C_6$ alkoxy, sulfamyl, chloro, iodo, bromo, fluoro, or trifluoromethyl;



(xv)

wherein

$R^a$ is as defined under (i) and $R^i$ is as defined under (xiv); or



(xvi)

wherein

$R^a$ is as defined under (i) and $R^1$ is (lower)alkyl, cycloalkyl of 3–12 carbon atoms, phenyl, a monocyclic heterocyclic radical having 5 or 6 atoms exclusive of hydrogen which are C, S, N or O, no more than 2 atoms being other than C, or a substituted monocyclic heterocyclic radical as defined above having one or more halo, (lower)alkyl, (lower)alkoxy or phenyl substituents, Z is esterified hydroxyl of the formula

$-OSO_2R_2'$

in which $R_2'$ is (lower)alkyl, trifluoromethyl or p-tolyl and R'' is hydrogen or an easily cleavable ester selected from the group consisting of benzhydryl, benzyl, p-nitrobenzyl, p-methoxybenzyl, trichloroethyl, trimethylsilyl, phenacyl, acetonyl, (lower)alkyl, triphenylmethyl, methoxymethyl, indanyl, phthalidyl, pivaloyloxymethyl and acetoxymethyl, or a pharmaceutically acceptable salt thereof.

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**4,166,907**

## 3,3-DICHLORO-2-AZETIDINONE DERIVATIVES HAVING ANTIINFLAMMATORY ACTIVITY

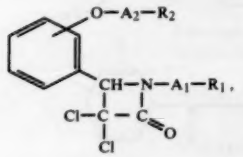
**John Krapcho, Somerset, and Chester F. Turk, Kendall Park, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.**

**Continuation-in-part of Ser. No. 737,864, Nov. 1, 1976, Pat. No. 4,064,120. This application Oct. 11, 1977, Ser. No. 840,701**

**Int. Cl.[2] C07D** *413/12, 401/12, 403/12*

**U.S. Cl. 544—111** **6 Claims**

1. A compound having the formula



or a pharmaceutically acceptable salt thereof, wherein $R_1$ is alkyl, cycloalkyl, phenyl, or phenyl substituted with a halogen, alkyl, alkoxy, trifluoromethyl, or nitro group; $R_2$ is 1-pyrrolidinyl, 1-piperidinyl, 4-morpholinyl, 1-piperazinyl or 4-alkyl-1-piperazinyl; $A_1$ is a saturated bond or an alkylene group having 1 to 4 carbon atoms; $A_2$ is an alkylene group having 2 to 5 carbon atoms; wherein alkyl and alkoxy are groups having 1 to 6 carbon atoms; and cycloalkyl is a group having 3 to 7 carbon atoms.

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**4,166,908**

## 2,6-DINITROANILINE HERBICIDES

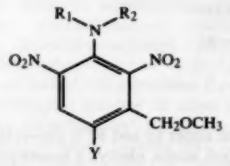
**Albert W. Lutz, Princeton, and Robert E. Diehl, Lawrenceville, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.**

**Continuation-in-part of Ser. No. 599,222, Jul. 25, 1975, which is a division of Ser. No. 323,000, Jan. 12, 1973, Pat. No. 3,920,742, which is a continuation-in-part of Ser. No. 262,807, Jun. 14, 1972, abandoned, which is a continuation-in-part of Ser. No. 174,938, Aug. 25, 1971, abandoned. This application Dec. 20, 1976, Ser. No. 752,052**

**Int. Cl.[2] C07D** *265/30, 295/06*

**U.S. Cl. 544—166** **2 Claims**

1. A compound having the structure:



wherein

Y is $CH_3$, $C_3H_7$-n, $C_3H_7$-i, $C_4H_9$-i, sec-$C_4H_9$, Cl, $CF_3$ or $C_2H_5$, and

$R_1$ and $R_2$ taken together with the nitrogen ar morpholino or 2,6-dimethylmorpholino.

**4,166,909**

## PROCESS FOR PREPARATION OF A SUBSTITUTED TRIAZINE

**Thomas H. Colby; Ernest R. Freitas, and William R. Durland, all of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.**

**Filed Jan. 23, 1978, Ser. No. 871,656**

**Int. Cl.[2] C07D** *251/50*

**U.S. Cl. 544—204** **7 Claims**

1. In the process for preparation of 2-chloro-4-ethylamino-6-isopropylamino-s-triazine by sequential reaction of cyanuric chloride with isopropylamine and ethylamine in the presence of an alkali metal hydroxide acid acceptor and a mixed acetone/water solvent system, the improvement which comprises; carrying out the initial reaction between cyanuric chloride and isopropylamine with at least a 4% molar excess over the stoichiometric amount of cyanuric chloride and subsequently treating the reaction product of this initial reaction with sufficient base to afford a pH in the reaction product of between about 6 and 11 thereby hydrolyzing excess cyanuric chloride present in the reaction product to a basic salt of monohydroxydichlorotriazine before the reaction product is passed to the second reaction stage.

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**4,166,910**

## 3-(NITROGEN CONTAINING HETEROCYCLIC)AMINO) BENZISOTHIAZOLE-1,1-DIOXIDE

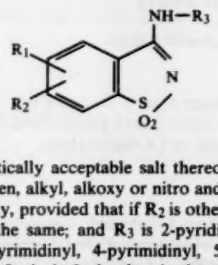
**Peter C. Wade, Pennington, N.J.; B. Richard Vogt, Yardley, Pa., and Thomas P. Kissick, Princeton, N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.**

**Filed Jul. 13, 1978, Ser. No. 924,426**

**Int. Cl.[2] C07D** *417/12*

**U.S. Cl. 544—212** **6 Claims**

1. A compound having the formula



or a pharmaceutically acceptable salt thereof, wherein $R_1$ is hydrogen, halogen, alkyl, alkoxy or nitro and $R_2$ is hydrogen, halogen or alkoxy, provided that if $R_2$ is other than hydrogen, $R_1$ and $R_2$ are the same; and $R_3$ is 2-pyridinyl, 3-pyridinyl, 4-pyridinyl, 2-pyrimidinyl, 4-pyrimidinyl, 5-pyrimidinyl, 2-pyrazinyl, or 1,3,5-triazin-2-yl; wherein the terms "alkyl" and "alkoxy" refer to groups having 1 to 4 carbon atoms.

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**4,166,911**

## PYRIDAZINYL-ERGOLINE COMPOUNDS HAVING NEUROLEPTIC ACTIVITY

**Luigi Bernardi; Carlo Elli; Giovanni Falconi, and Alberto Bonsignori, all of Milan, Italy, assignors to Farmitalia Carlo Erba S.p.A., Milan, Italy**

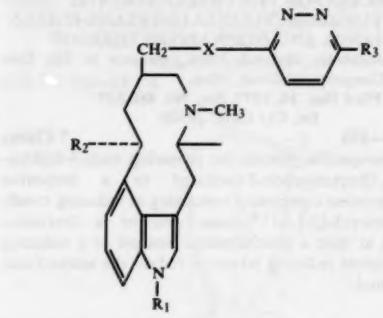
**Filed Jan. 17, 1978, Ser. No. 870,095**

**Claims priority, application United Kingdom, Feb. 2, 1977, 4302/77**

**Int. Cl.[2] C07D** *457/02;* **A61K** *31/50*

**U.S. Cl. 544—238** **6 Claims**

1. Pyridazinyl-ergoline compounds having the formula (I)



(I)

wherein

$R_1$ is hydrogen or methyl;

$R_2$ is hydrogen or methoxyl;

$R_3$ is selected from the group consisting of hydrogen, methyl, hydroxyl, methoxyl, methylthio, Cl and Br; and

X is S.

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**4,166,912**

**9-DEOXY-9-METHYLENE-INTER-PHENYLENE-16-PHENYL-PGF COMPOUNDS**

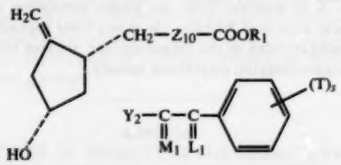
**Gordon L. Bundy, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.**

**Continuation-in-part of Ser. No. 786,249, Apr. 11, 1977, Pat. No. 4,118,584. This application Jul. 12, 1978, Ser. No. 924,035**

**Int. Cl.**[2] **C07C** *177/00*

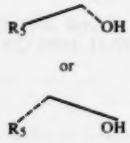
**U.S. Cl. 560—61** **127 Claims**

1. A prostaglandin analog of the formula



wherein $Y_2$ is trans—CH=CH— or $—CH_2CH_2—$;

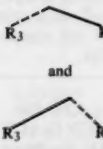
wherein $M_1$ is



wherein $R_5$ is hydrogen or methyl;

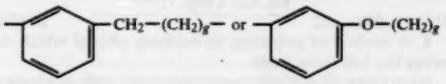
wherein $L_1$ is

or a mixture of



wherein $R_3$ and $R_4$ are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of $R_3$ and $R_4$ is fluoro only when the other is hydrogen or fluoro;

wherein $Z_{10}$ is



wherein g is one, 2, or 3;

wherein T is chloro, fluoro, trifluoromethyl, alkyl of one to 3 carbon atoms, inclusive, or alkoxy of one to 3 carbon atoms, inclusive, and s is zero, one, 2, or 3, the various T's being the same or different, with the proviso that not more than two T's are other than alkyl;

wherein $R_1$ is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation, and the 1,11- or 1,15-lactones thereof.

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**4,166,913**

**PREPARATION OF UNSATURATED DIESTERS BY THE CATALYTIC OXIDATIVE CARBONYLATION OF DIOLEFINS WITH AN ENOL ETHER AND AN ALCOHOL**

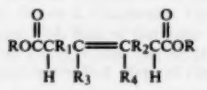
**Haven S. Kesling, Jr., Drexel Hill, and Lee R. Zehner, Media, both of Pa., assignors to Atlantic Richfield Company, Los Angeles, Calif.**

**Filed Jul. 8, 1977, Ser. No. 814,012**

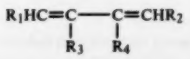
**Int. Cl.**[2] **C07C** *69/52*

**U.S. Cl. 560—204** **28 Claims**

1. A process for the preparation of an unsaturated diester having the formula



wherein R is an alkyl group of from 1 to 8 carbon atoms or an aralkyl group containing 6 carbon atoms in the ring and from 1 to 4 carbon atoms in the alkyl substituent and $R_1$, $R_2$, $R_3$ and $R_4$ is hydrogen, a halogen, an alkyl group of from 1 to 4 carbon atoms or an aryl group containing 6 carbon atoms in the ring, which comprises reacting a diolefin having the formula



wherein $R_1$, $R_2$, $R_3$ and $R_4$ which may be the same or different are as above described, with a mixture of carbon monoxide and oxygen and at least a stoichiometric amount of an enol ether or alkoxycycloalkene and an equal molar quantity of a monohydric saturated aliphatic, alicyclic or aralkyl alcohol based on the enol ether or alkoxycycloalkene at a pressure of between about 15 psig and 5000 psig and at a temperature in the range

of about 25° C. to 200° C. in the presence of an effective amount of a catalytic mixture of a platinum group metal compound or mixtures thereof and a copper (I), copper (II), iron (II) or iron (III) oxidant salt compound and recovering the desired unsaturated diester.

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**4,166,914**

## PRODUCTION OF O-ALKOXYPHENOLS

**Carl E. Van Winckel, 1425 Sandhurst Pl., West Vancouver, B. C., Canada; David H. Dolphin, Vancouver, Canada; Elena Dumitrescu, Burnaby, Canada, and Kent F. Van Winckel, West Vancouver, Canada, assignors to Carl E. Van Winckel, West Vancouver, Canada**

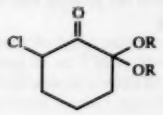
**Continuation-in-part of Ser. No. 713,784, Aug. 12, 1976, abandoned. This application May 31, 1977, Ser. No. 802,181**

**Int. Cl.**[2] **C07C** *41/00*

**U.S. Cl. 568—652** **14 Claims**

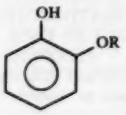
1. A method of preparing an o-alkoxy phenol which comprises the following steps:

(a) reacting 2,2,6-trichlorocyclohexanone with an excess of a $C_1$ to $C_4$ alkanol in a non-aqueous system, in the presence of a base and at a temperature not exceeding about 90° C., thereby forming as an intermediate a dialkoxy chloro ketone having the formula




wherein R is $C_1$ to $C_4$ alkyl

(b) then converting such intermediate to the o-alkoxyphenol




by heating in the presence of an organic base.

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**4,166,915**

## PROCESS FOR THE PREPARATION OF ENDO-6-HYDROXYBICYCLO[2.2.1]HEPTANE-ENDO-2-METHANOL AND DERIVATIVES THEREOF

**Fredric L. Buchholz, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.**

**Filed Dec. 14, 1977, Ser. No. 860,537**

**Int. Cl.**[2] **C07C** *29/00*

**U.S. Cl. 568—820** **7 Claims**

1. A stereo-specific process for preparing endo-6-hydroxybicyclo[2.2.1]heptane-endo-2-methanol or a derivative thereof, the process comprising contacting at reducing conditions 6-oxatricyclo[3.2.1.$1^{3,8}$]nonan-7-one or a derivative thereof with at least a stoichiometric amount of a reducing agent of sufficient reducing power to reduce the nonan-7-one to the methanol.

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**4,166,916**

## SUBSTITUTED BICYCLOOCTENEMETHANOLS

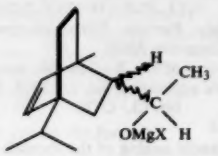
**James M. Sanders, Eatontown; Joaquin F. Vinals, Red Bank, and Frederick L. Schmitt, Holmdel, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.**

**Division of Ser. No. 780,685, Mar. 23, 1977, Pat. No. 4,128,729. This application Jun. 8, 1978, Ser. No. 913,697**

**Int. Cl.**[2] **C07C** *35/22;* **C07F** *3/02*

**U.S. Cl. 568—820** **3 Claims**

1. An organometallic compound having the structure:

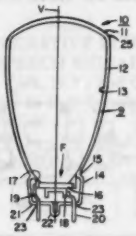



wherein X is selected from the group consisting of chloro, bromo and iodo and wherein the wavy lines represent exo or endo configurations of the bicyclooctene nucleus with respect to the organometallic oxyethane moiety.

## 4,166,917
## CONCENTRATING SOLAR RECEIVER

William G. Dorfeld, Lindley, N.Y., and Ugur Ortabasi, San Juan, P.R., assignors to Corning Glass Works, Corning, N.Y.

Filed May 22, 1978, Ser. No. 907,946
Int. Cl.[2] H01L *31/04*
U.S. Cl. 136—89 CA 17 Claims




1. A concentrating solar energy receiver responsive to impinging solar radiation for converting same to useful energy comprising: an integral enclosed envelope having a solar window adapted to be oriented toward the sun; a concentrating portion integral with said solar window; a reflector surface in communication with said concentrating portion downstream of said solar window for concentrating radiation impinging thereon, said reflector surface providing a focal zone wherein said reflected radiation is generally concentrated; absorber means disposed in said focal zone for intercepting and absorbing said concentrated radiation, including a photosensitive means for converting said radiant solar energy into an electrical current and a thermal absorber for absorbing radiation and converting said radiation into thermal energy, and energy conductive means coupled to said absorbing means for removing the electrical and thermal energy produced by said absorber means including at least one energy conductive lead in contact with each of opposed faces of said absorber means and at least one pin coupled to each lead adapted to sealably perforate a downstream end of said envelope, each lead and corresponding pin carrying electrical and thermal energy away from said cell, said envelope being sealed against ambient and enclosing an atmosphere of selected constituents under a selected partial pressure.

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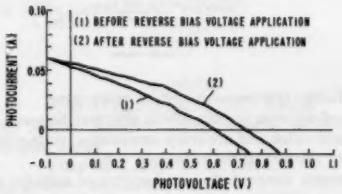
## 4,166,918
## METHOD OF REMOVING THE EFFECTS OF ELECTRICAL SHORTS AND SHUNTS CREATED DURING THE FABRICATION PROCESS OF A SOLAR CELL

Gerald E. Nostrand, Jamesburg, and Joseph J. Hanak, Lawrenceville, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Jul. 19, 1978, Ser. No. 926,083
Int. Cl.[2] H01L *31/04*
U.S. Cl. 136—89 R 10 Claims




1. A method of improving the performance of a solar cell which incorporates a thick film cermet electrode contacting the active region of said solar cell opposite to a surface incident to solar radiation comprising:

applying a reverse bias voltage of sufficient magnitude to burn out the defects in said solar cell but less than the breakdown voltage of said cell.

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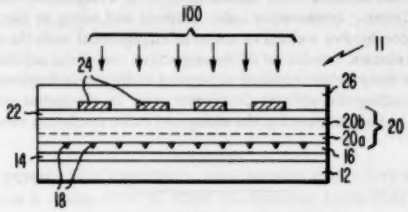
## 4,166,919
## AMORPHOUS SILICON SOLAR CELL ALLOWING INFRARED TRANSMISSION

David E. Carlson, Yardley, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Sep. 25, 1978, Ser. No. 945,602
Int. Cl.[2] H01L *31/06*
U.S. Cl. 136—89 CL 14 Claims




1. In an amorphous silicon solar cell comprising a transparent substrate having a major surface incident to solar radiation and a major surface opposite to said incident surface, a first transparent electrode deposited on said substrate, an active region of amorphous silicon having regions of differing conductivity, fabricated by a glow discharge in a silicon-hydrogen containing atmosphere, deposited on said first transparent electrode, means for defining a rectifying junction within or at the surface of said active region, a second transparent electrode deposited over said rectifying junction, and an antireflection layer deposited on said second electrode wherein the improvement comprises at least one layer of a transparent material having an index of refraction greater than about 2.5 contacting at least one of said major surfaces of said transparent substrate.

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## 4,166,920
## MULTI-SECTION INTERNALLY COOLED HIGH-VOLTAGE HIGH-ENERGY CABLE AND A METHOD OF MANUFACTURING THE SAME

Jürgen Friedrich, Cologne; Heinrich Brakelmann, Kamp-Lintfort, and Werner Rasquin, Cologne, all of Fed. Rep. of Germany, assignors to Felten & Guilleaume Carlswerk Aktiengesellschaft, Cologne, Fed. Rep. of Germany

Filed Jul. 19, 1977, Ser. No. 817,110
Claims priority, application Fed. Rep. of Germany, Jul. 21, 1976, 2632808
Int. Cl.[2] H01B *7/34;* H02G *3/06*
U.S. Cl. 174—15 C 10 Claims

1. In an internally cooled megavolt-ampere cable, in combination, a plurality of elongated cable sections each including an electric conductor of tubular configuration and a metallic corrosion-resistant inner tubular member directly within said electric conductor and defining the internal cooling channel of the megavolt-ampere cable, the electric conductor of each cable section having two longitudinally spaced ends, and the metallic corrosion-resistant inner tubular member of each cable section likewise having two longitudinally spaced ends, the

two longitudinally spaced ends of the electric conductor being less distant from each other than are the two longitudinally spaced ends of the metallic corrosion-resistant inner tubular member within the electric conductor; and means for connecting the ends of consecutive ones of the cable sections of the megavolt-ampere cable to each other, including a first, welded connection sealingly and electrically connecting together the ends of the metallic inner tubular members of consecutive cable sections; an elongated electrically conductive current-carrying bridging element having two longitudinally spaced end portions and having a central portion surrounding the first, welded connection, each of the two end portions of the elongated conductive bridging element being located longitudinally intermediate the end of the electric conductor and the end of the metallic inner tubular member of a respective one of the adjoining consecutive cable sections and being in electrically conductive welded or soldered engagement with the end of the electric conductor of the respective one of the adjoining consecutive cable sections; elongated cable insulating means surrounding the electric conductor; and an elongated outer cable jacket surrounding the elongated cable insulating means.

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**4,166,921**

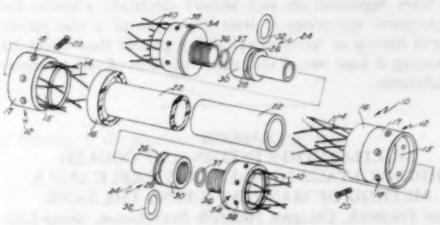
## FLEXIBLE HOUSING, IN-LINE ELECTRONIC

**Raymond J. Phillips, Oakdale, and Anthony R. Susi, Waterford, both of Conn., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Aug. 29, 1977, Ser. No. 828,710**

**Int. Cl.[2] H02G *9/00***

**U.S. Cl. 174—70 S** **3 Claims**



1. An in-line electronic flexible housing comprising:

a pair of cylindrical end terminations with each of said terminations incuding an interior and an exterior cylindrical piece;

strand strength members arranged in a basket weave configuration attached to each of said cylindrical end terminations;

a flexible material enclosing and attached to said strength members, said flexible material slipped over a portion of each interior cylindrical piece and abutting an end of each exterior cylindrical piece, said flexible material having an outer diameter substantially equal to the outer diameter of each exterior cylindrical piece; and

water sealing means for keeping the interior of said flexible housing watertight enclosed inside said cylindrical end terminations, said strength members and said flexible material, said water sealing means includes an inner sleeve, a pair of O-ring retainers with each of said retainers inserted in opposing ends of said inner sleeve, a pair of first O-rings with each of said first O-rings inserted between each of said retainers and said inner sleeve, and a pair of second O-rings with each of said second O-rings inserted in the interior of each of said retainers.

**4,166,922**

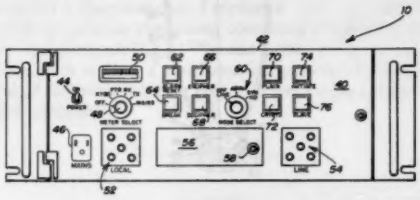
## MULTI-MODE DIGITAL ENCIPHERING SYSTEM WITH REPEATED PRIMING SEQUENCES

**Frederick A. Kinch, Jr., Richardson, and Barrie O. Morgan, Dallas, both of Tex., assignors to Datotek, Inc., Dallas, Tex.**

**Division of Ser. No. 568,096, Apr. 14, 1975, Pat. No. 4,079,188. This application Sep. 9, 1977, Ser. No. 832,068**

**Int. Cl.[2] H04L *9/00***

**U.S. Cl. 178—22** **8 Claims**



1. Prime circuitry for a digital cipher system comprising:

a key generator for generating a priming sequence composed of a plurality of random digital prime bits,

a storage circuit,

means for transmitting said priming sequence to a remote cipher unit and simultaneously to said storage circuit,

means for accessing said storage circuit for repetitively transmitting said priming sequence to the remote cipher unit so that said priming sequence is transmitted a predetermined number of times, and

said remote cipher unit including receiving means for building a single received sequence with each bit of said received sequence being determined by the corresponding bits of each of said priming sequences.

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**4,166,923**

## AMPLITUDE- AND PERIODIC PHASE-MODULATION TRANSMISSION SYSTEM

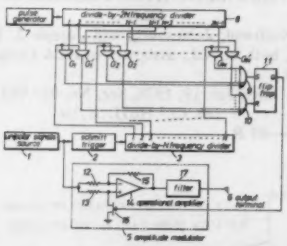
**Kazuo Kobayashi; Kiyohiro Yuki, both of Tokyo, and Yutaka Suzuki, Tokorozawa, all of Japan, assignors to Nippon Telegraph & Telephone Public Corporation, Tokyo, Japan**

**Filed Jul. 16, 1975, Ser. No. 596,539**

**Claims priority, application Japan, Jul. 19, 1974, 49-83576; Apr. 12, 1975, 50-44999**

**Int. Cl.[2] H04L *27/24***

**U.S. Cl. 178—67** **10 Claims**



1. An efficient transmission system comprising:

a source of unipolar signals which alternate between a fixed reference value and arbitrary amplitudes having the same polarity relative to the reference value;

circuit means, connected to said source of unipolar signals, for sequentially assuming one of predetermined N statuses, independent of said amplitude, each time an individual unipolar signal is obtained;

phase modulator means connected to said circuit means for

generating a carrier having one of predetermined N phases in response to each status of said circuit means; and

amplitude modulator means connected to said source for amplitude modulating said phase modulated carrier with the train of unipolar signals.

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**4,166,924**

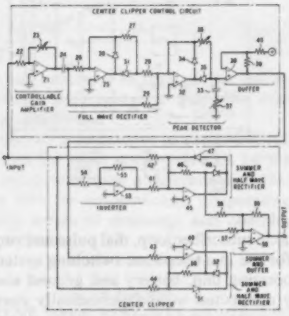
## REMOVING REVERBERATIVE ECHO COMPONENTS IN SPEECH SIGNALS

**David A. Berkley, New York, N.Y., and Olga M. M. Mitchell, Summit, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Continuation-in-part of Ser. No. 796,074, May 12, 1977, abandoned. This application Feb. 22, 1978, Ser. No. 880,186**

**Int. Cl.[2] H04B** *15/00*

**U.S. Cl. 179—1 P** **9 Claims**




1. In a speech processing apparatus for suppressing reverberant tails, said apparatus comprising at least one channel having a center clipper having input, output and control ports with said input and output ports connected in said channel to place said center clipper in series connection therewith and, furthermore, having a center clipper level control circuit having input and output ports with said output port connected to said center clipper control port, AN IMPROVEMENT CHARACTERIZED IN THAT

said input port of said center clipper level control circuit is connected to said input port of said center clipper to cause said center clipper and said center clipper level control circuit to receive the same input signals;

said control circuit and said clipper cooperating to cause the clipping level of said clipper to increase as the envelope of said input signal increases; and

said control circuit including an operational amplifier circuit with charging and discharging paths so that said control circuit has an output characteristic whereby any output produced thereby decreases at a determined rate over a period of time when the input to said control circuit is terminated to cause clipping to suppress said reverberant tails in the output of said clipper.

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**4,166,925**

## FM STEREO DEMODULATOR

**Masanori Ienaka, Kodaira, Japan, assignor to Hitachi, Ltd., Ohtemachi, Japan**

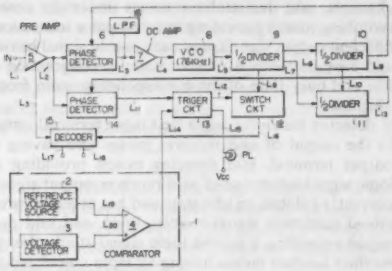
**Filed Apr. 3, 1978, Ser. No. 892,672**

**Claims priority, application Japan, May 20, 1977, 52/57707**

**Int. Cl.[2] H04H** *5/00;* **H04B** *1/10*

**U.S. Cl. 179—1 GM** **5 Claims**

1. An FM stereo demodulator comprising a detection unit which detects a power supply voltage deficiency of sufficient absolute value to induce a fluctuation in the oscillation frequency of an oscillator circuit, and a control circuit which




compulsorily switches stereo reproduction to monaural reproduction on the basis of an output of said detection unit.

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**4,166,926**

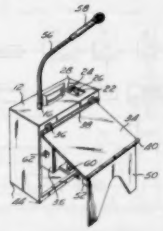
## PORTABLE LECTERN AND VOICE AMPLIFIER

**George J. Sieler, 1308 W. 130th St., Gardena, Calif. 90247**

**Filed Jun. 7, 1978, Ser. No. 913,349**

**Int. Cl.[2] H05K** *5/02*

**U.S. Cl. 179—1 AT** **12 Claims**



1. In a portable lectern and voice amplifier, a combination comprising:

a case including a top panel, bottom panel, front panel, rear panel and two side panels;

fastening means to attach said rear panel along its top edge to said case, said fastening means allowing said rear panel to be pivotally extended away from said case into an inclined orientation; and

a support member pivotally mounted to the undersurface of said rear panel by hinge means laterally displaced from the plane of said support memeber, said means permitting said member to be first swung downward into a substantially vertical position beneath said rear panel to maintain said inclined orientation of said rear panel, and then swung upward into a substantially parallel position with said undersurface of said rear panel to close said case with said support member stowed within said case.

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**4,166,927**

## APPARATUS AND METHOD FOR FREQUENCY CHANNEL SELECTION IN A RADIOTELEPHONE SYSTEM

**Roy T. Hamaoki, Richmond, Canada, assignor to British Columbia Telephone Company, Burnaby, Canada**

**Filed Jul. 21, 1978, Ser. No. 926,985**

**Int. Cl.[2] H04M** *7/04*

**U.S. Cl. 179—2 EB** **2 Claims**

1. In a mobile radiotelephone system having N separated radio frequency channels, apparatus for selecting the particular

idle frequency channel having the best signal-to-noise ratio, said apparatus comprising:

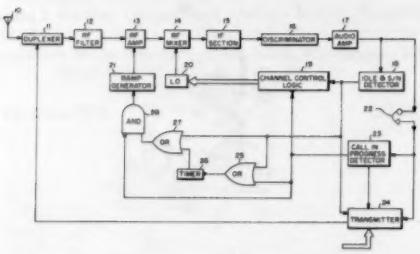
demodulating receiver means for receiving N different modulated carrier signals in each of said N radio frequency channels, said demodulator means under the control of switching means providing at an output a succession of N different output signals, and each output signal having idle and busy mutually exclusive states corresponding to the idle and busy state of the corresponding radio frequency channel;

first detector means having a first input terminal connected to the output of said receiver means and having a first output terminal, said detector means providing a first logic signal when one of said receiver output signal concurrently exhibits an idle state and has at least a predetermined minimum signal-to-noise level, and said detector means providing a second logic signal at all other times;

subscriber handset means having an input connected to said receiver means output and having a second output terminal, said handset means having on-hook and off-hook mutually exclusive states;

a call-in-progress state detector for detecting the on-hook and off-hook states of said handset means, said state detector having an input connected to said second output terminal and also having a third output terminal providing an on-hook and off-hook output signal indicative of the on-hook and off-hook states respectively of said handset means;

receiver switching means having an output and second and third input terminals, said output adapted for connection to said receiver means, said second input terminal connected to said first output terminal, and said third input terminal connected to said third output terminal, said switching means for cyclically switching said receiver means to each of said N frequency channels in response either to said first logic signal or to said off-hook signal; and




gain control means having an output and fourth and fifth input terminals, said output adapted for connection to said receiver means, said fourth input terminal connected to said first output terminal, and said fifth input terminal connected to said third output terminal, said gain control means producing a control output signal for causing a decrease in the gain sensitivity of said receiver means from a predetermined maximum gain to a predetermined minimum gain and thereafter for causing an increase in said gain sensitivity to said predetermined maximum, said gain increase occurring at a rate substantially slower than the rate of gain decrease so that the period of time required for said switching means to switch said receiver means to each of said N frequency channels at least once is substantially greater than the time required for the gain sensitivity to increase from said minimum to said maximum, said control output signal being produced in response to either

(a) a change in state of said first detector means output signal from said first logic signal to said second logic signal or

(b) in response to a predetermined timed interval after a change in output state of said first detector means from said first logic signal to said second logic signal unless an off-hook output signal is produced by said call-in-progress detector, and

said gain control means being inhibited from generating said control output signal whenever an off-hook indication from said call-in-progress detector means is produced.

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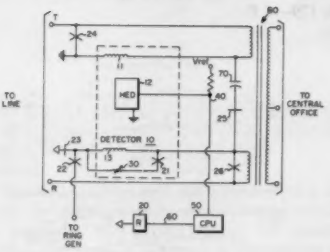
**4,166,928**

## LOOP, DIAL PULSE AND RING TRIP DETECTION CIRCUIT

**Robert J. Sabon, Chicago, Ill., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.**

**Filed Dec. 29, 1977, Ser. No. 865,761**
**Int. Cl.[2] H04B *3/46*; H04M *3/02***
**U.S. Cl. 179—18 FA** **7 Claims**




**1**. A telephone subscriber loop, dial pulse and ring trip detection circuit, for use in a telephone switching system, including a central processing unit, battery and ground sources, and a ringing relay connected to and periodically operated in response to said central processing unit, said ringing relay including a first pair of contacts, and said detection circuit connected to a plurality of subscriber substations by a plurality of subscriber loop circuits,

said detection circuit, comprising:

magnetic flux generating means included in said subscriber loop operated in response to an absence of current flow from said battery to said ground in said subscriber loop to generate a magnetic flux of a first characteristic; said magnetic flux generating means further operated in response to said current flow from said battery to said ground in said subscriber loop to generate a magnetic flux of a second characteristic;

magnetic flux detection means connected in magnetic field proximity to said magnetic flux generating means operated in response to said magnetic flux of said first characteristic to generate a first output signal and said detection means further operated in response to said magnetic flux of said second characteristic to generate a second output signal; and

shunting means connected in parallel with said magnetic flux generating means by said first pair of ringing relay contacts, said shunting means providing a low impendance path around said magnetic flux generating means.

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**4,166,929**

## INTEROFFICE CALLBACK ARRANGEMENT

**Daniel Sheinbein, Elizabeth, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Feb. 17, 1978, Ser. No. 878,513**
**Int. Cl.[2] H04M *3/48*; H04Q *3/54***
**U.S. Cl. 179—18 BG** **24 Claims**

**16**. A callback arrangement for use in a communication switching system having

a network for establishing call connections with a calling station,

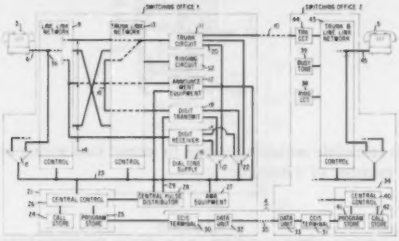
a register for storing callback information including calling and called station data when call connections cannot

currently be completed from said calling station to a called station due to a busy condition, and

a call processor responsive to the information stored in the register for automatically cooperating with the network to reattempt the completion of the cell connections,

characterized in that

common channel interoffice signaling equipment is effective following a receipt of called station busy signals from another communication switching system for cooperating



with the call processor to transmit the callback information stored in said register to the other communication switching system, and

said call processor is responsive to a return of callback information from the other communication switching system via said equipment upon a determination that the called station is idle for automatically cooperating with said establishing means to reattempt said completion of said call connections.

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**4,166,930**

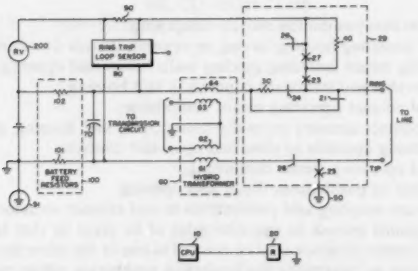
## TRANSIENT FREE RING RELAY CIRCUIT FOR ARBITRARY TIME SWITCHING

**Richard M. Rovnyak, Schaumburg, Ill., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.**

**Filed Feb. 22, 1978, Ser. No. 879,976**

**Int. Cl.² H04M *3/04***

**U.S. Cl. 179—18 HB** **8 Claims**



1. A ring relay circuit for use in a telephone switching system, said switching system including a central processing unit, a transmission circuit, a ringing signal source and a line connecting said switching system to a subscriber station, said relay circuit comprising:

switching control means connected to said central processing unit;

first and second switching means each associated with and operable in response to energization of said switching control means;

said first switching means normally connecting said line to said transmission circuit and operable to connect said ringing signal source to said line;

first current limiting means included in said connection between said line and said transmission circuit; and

said second switching means normally providing a shunt around said first current limiting means;

said switching control means energized in response to said central processing unit to operate said first switching means, to initially connect said line to said ringing signal source, and to further disconnect said line from said transmission circuit, and to operate said second switching means to discconect said shunt arround said first current limiting means, whereby the flow of current from said ringing signal source to said transmission circuit is limited and harmful transients are inhibited.

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**4,166,931**

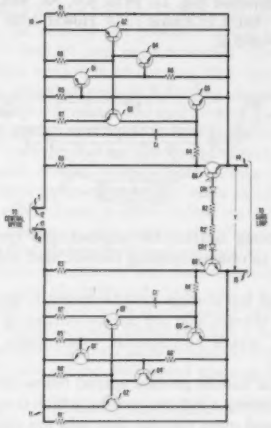
## MINIATURE BRIDGE LIFTER FOR TELEPHONE LINES

**William F. MacPherson, Winfield Township, DuPage County, Ill., and Irving M. McNair, Jr., Mendham Township, Morris County, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Apr. 24, 1978, Ser. No. 899,286**

**Int. Cl.² H04M *13/00***

**U.S. Cl. 179—35** **10 Claims**



1. An automatic bridge lifting circuit responsive to signal levels in a telephone circuit to provide a low impedance shunt across a series impedance in that circuit

a two-terminal voltage detection circuit bridged across said telephone circuit and responsive to the voltage level across said telephone circuit to enable said low impedance shunt.

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**4,166,932**

## OPTICAL MICROPHONE WITH RECTANGULAR FIBER OPTICS

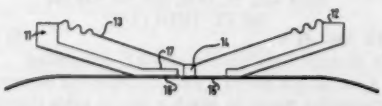
**Peter R. Selway, Sawbridgeworth, England, assignor to International Standard Electric Corporation, New York, N.Y.**

**Filed Aug. 25, 1978, Ser. No. 936,958**

**Claims priority application, United Kingdom, Sep. 7, 1977, 37287/77**

**Int. Cl.² H04R *23/00***

**U.S. Cl. 179—121 R** **6 Claims**



1. A fiber optic transducer comprising:

a housing means;

flexible diaphram means supported on said housing;

a first optical fiber having a rectangular cross section, one end of said first optical fiber being secured to said diaphragm;

a second optical fiber, having a rectangular cross section being secured to said housing, said secured ends of said first and second optical fibers being positioned to provide optical coupling therebetween, such that movement of said diaphragm causes corresponding variations in the degree of coupling between said fiber ends for linearly amplitude modulating light signals passing between said fiber ends.

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**4,166,933**

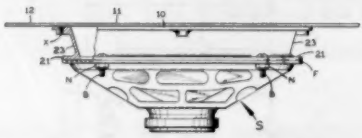
## REAR DECK MOUNTING ADAPTER FOR CAR SPEAKER

**Michael J. Cinquino, 11020 NW. 22nd St., Pembroke Pines, Fla. 33026**

**Continuation-in-part of Ser. No. 899,316, Apr. 24, 1978. This application Sep. 21, 1978, Ser. No. 944,561**

**Int. Cl.[2] H04R** *1/28;* **H04M** *1/04*

**U.S. Cl. 179—146 E** **1 Claim**



1. A mounting adapter for suspending a speaker below a deck having an oblong-opening therein, said adapter comprising:

a peripheral top portion for attachment to said deck at said opening therein, said top portion bordering an oblong top opening which corresponds substantially to said deck opening;

a peripheral bottom portion spaced below said top portion and bordering a bottom opening which is appreciably less oblong and more circular than said top opening and said deck opening, said bottom portion being attachable to a speaker having a mouth at its upper end which corresponds substantially to said bottom opening;

and a rigid annular sidewall tapering from said bottom portion around said bottom opening up to said top portion around said opening for funneling sound coming from the mouth of the speaker to said deck opening;

said bottom opening lying in one plane and said top opening lying in another plane forming an acute angle with said one plane.

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**4,166,934**

## MODULAR ELECTRICAL SWITCH/OUTLET ASSEMBLY

**Louis Marrero, 1209 Via Ramon, Escondido, Calif. 92025**

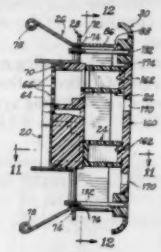
**Filed Aug. 15, 1978, Ser. No. 934,062**

**Int. Cl.[2] H01R** *13/70*

**U.S. Cl. 200—51 R** **24 Claims**

1. A modular switch/outlet assembly comprising:

(a) a wiring box having a pair of conductive elements with connection means to attach a pair of wires thereto, said conductor elements each having at least one externally accessable contact point for the coupling thereto of an electric utilization means and means to releasibly mount a utilization means in coupled relationship to said conductive elements and in electrical contact with said contact points; and,



(b) releasible mounting means to mount said wiring box to a member of a building.

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**4,166,935**

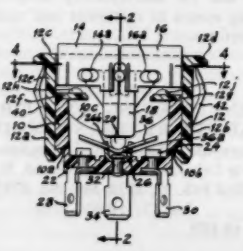
## ALTERNATELY-OPERABLE TWO-PUSHBUTTON SWITCH

**Thomas E. Norby, Raleigh, N.C., assignor to Cutler-Hammer, Inc., Milwaukee, Wis.**

**Filed Sep. 22, 1978, Ser. No. 945,012**

**Int. Cl.[2] H01H** *13/22, 21/40, 3/12*

**U.S. Cl. 200—72 R** **14 Claims**



1. A two-pushbutton switch comprising:

an insulating housing having an opening therein for operating means including guiding walls below said opening;

movable and stationary contacts in said housing;

and contact operating means comprising:

a contact actuator pivotally mounted in said housing and being operable to close and open said contacts;

and operating means comprising:

a pair of pushbuttons filling said opening;

means coupling said pushbuttons to said contact actuator at points spaced on opposite sides of its pivot so that said contact actuator may be pivoted in one or the other direction by depressing the respective pushbutton while causing the other pushbutton to correspondingly rise up;

and inter-guiding means on said pushbuttons for guiding one another in their vertical reciprocal motions while also being guided by said walls of said housing.

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**4,166,936**

## VISCOSITY-COMPENSATING FLOW SWITCH

**Charles Tice, Plantsville, Conn., assignor to DeLaval Turbine Inc., Princeton, N.J.**

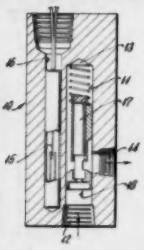
**Filed Feb. 1, 1978, Ser. No. 874,260**

**Int. Cl.[2] H01H** *35/38*

**U.S. Cl. 200—82 E** **9 Claims**

1. A magnetically operated flow switch comprising a body having an elongate cylindrical bore closed at one end and establishing an inlet port at the other end, said body having an

outlet port communicating with the bore at a location spaced from both ends of the bore, magnetic-reed switch contacts carried by said body alongside the bore and at a location predetermined for a set point of monitored flow between said inlet and outlet ports, a piston including a metering-head portion having a cylindrical periphery in circumferentially continuous close running clearance with the bore and deriving movable support in the bore between said ports and a permanent-magnet tail portion deriving movable support in the bore between the closed end and said outlet port, said piston including a



reduced central body portion between said head and tail portions, said piston having a central axial passage through said head portion and including a restrictive orifice establishing controlled fluid communication between said ports, and said tail portion including plural angularly spaced ribs at the region of bore support, the sectional area between ribs substantially exceeding the effective orifice area, whereby fluid flow via said passage and therefore between inlet and outlet ports is limited to the fluid at the central region of the section of inlet flow, thereby minimizing changes in switch response as a function of fluid viscosity.

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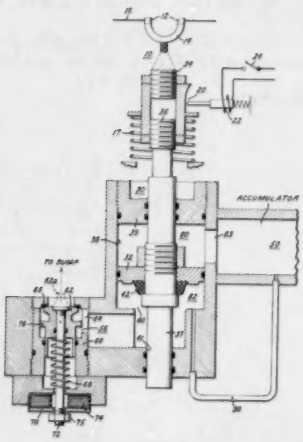
**4,166,937**

## HYDRAULICALLY-ACTIVATED OPERATING SYSTEM FOR AN ELECTRIC CIRCUIT BREAKER

**Imdad Imam, Secane, Pa., and Philip Barkan, Stanford, Calif., assignors to General Electric Company, Philadelphia, Pa.**

**Filed May 18, 1978, Ser. No. 907,220**
**Int. Cl.[2] H01H *35/38***
**U.S. Cl. 200—82 B** **14 Claims**




1. In a hydraulically-actuated operating system for an electric circuit breaker,

(a) a fluid motor comprising a cylinder and a movable piston adapted to move in an opening direction within said cylinder to open said circuit breaker and in a reverse direction within said cylinder to close the circuit breaker, the cylinder space at one side of said piston constituting a breaker-opening space in which pressurized liquid can act on said piston to open said circuit breaker and the cylinder space at the opposite side of said piston constituting a breaker-closing space in which pressurized liquid can act on said piston to close said circuit breaker,

(b) an accumulator freely communicating with said breaker-opening space for supplying pressurized liquid thereto during a circuit-breaker opening operation,

(c) a normally-closed valve located on the breaker-closing-space side of said piston and openable to release liquid from said breaker-closing space so that pressurized liquid in said breaker-opening space can drive said piston in an opening direction, said valve comprising a movable valve member that is movable from a valve-closed position to a valve-open position to open said valve and is returnable to said valve-closed position to close said valve,

(d) means operable in response to the pressure in the breaker-closing space dropping to a predetermined level for returning said valve member to said valve-closed position following a circuit-breaker opening operation,

(e) means for causing the pressure in the breaker-closing space to drop to said predetermined level immediately after piston motion in an opening direction is terminated,

(f) and an impeded passage affording communication between said accumulator and said breaker-closing space for allowing pressurized liquid to flow from said accumulator to said breaker-closing space and develop a pressure within said breaker-closing space substantially equal to accumulator pressure when said valve member is returned to said valve-closed position following a circuit-breaker opening operation, said passage affording communication between said accumulator and said breaker-closing space during opening motion of said piston but being so impeded that the flow therethrough from said accumulator into said breaker-closing space is sufficiently low during initial opening motion of said piston through a substantial portion of its opening stroke as to avoid interference with said piston motion during said initial opening motion of the piston.

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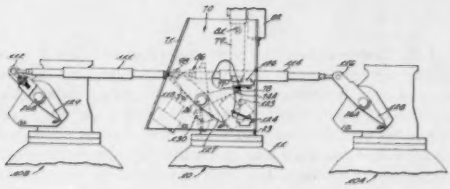
**4,166,938**

## DRIVE FOR HIGH SPEED DISCONNECT SWITCH

**Henry L. Peek, 136 Whippoorwill Rd., Brandon, Miss. 39042**

**Filed Sep. 28, 1977, Ser. No. 837,161**
**Int. Cl.[2] H01H *3/30, 3/46***
**U.S. Cl. 200—153 G** **13 Claims**



1. In a gas insulated switch having a gas tight enclosure in which a first contact and a second contact are located for opening and closing movement relative to each other;

a drive shaft extending into said gas tight enclosure and being operably connected to effect relative movement between said contacts in a switch closing operation and in a switch opening operation when operated in a first direction and in a second direction respectively, said drive shaft having a switch drive crank affixed thereto,

a drive mechanism operably connected to effect the movement of said drive shaft in one direction or the other selectively when actuated and including a spring drive

crank rotatable about the axis of said drive shaft and having a lost motion connection with said switch drive crank,

stored energy means including an overcenter compression spring having one end pivoted at a fixed point and being pivotally connected at its other end to said spring drive crank and being operably connected to be charged by the operation of said drive mechanism,

reversible power means operably connected to initiate the operation of said drive mechanism to a position wherein said compression spring has been charged and moved overcenter and said drive shaft has been moved sufficiently far to have effected relative movement of said contacts to a point short of an open position when said shaft is rotated in said second direction and to a point short of engagement of said contacts when said shaft is rotated in said first direction, and

means to render said power means inactive when said compression spring has been moved overcenter in either direction of rotation of said shaft;

said stored energy means operably connected to effect the final operation of said drive mechanism after said power means has been inactivated and to effect rapid movement of said contacts relative to each other to open position and to closed position respectively when said drive shaft is operated in said second direction and in said first direction.

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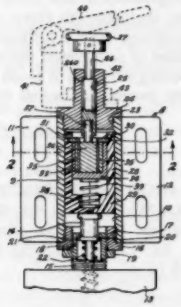
**4,166,939**

## IMPULSE ACTUATOR UNIT FOR SWITCHES

**William K. Switzer, 5703 Sprucewood Dr., Cincinnati, Ohio 45239**

**Filed Jun. 15, 1978, Ser. No. 915,795**
**Int. Cl.[2] H01H *13/56***
**U.S. Cl. 200—160** **6 Claims**



**1.** In combination with a switch operated by a spring pressed axially moveable plunger having limited axial movement, a momentary impulse actuator unit for producing an impulse in said switch comprising a housing having a central bore in alignment with the plunger, a hollow free-floating piston reciprocal within the bore and normally disposed in inoperative condition at one end of the bore, said piston having one end in engagement with the plunger, a ferromagnetic member mounted in the opposite end of the piston, a permanent magnet assembly reciprocal within the piston and normally retained in said opposite end of the piston by the magnetic attraction to the member, an operating push rod mounted for reciprocating movement in the housing and having its inner end in engagement with the permanent magnet, the flux attraction between the magnet and the ring being greater than the spring pressed force of the plunger, and means for operating the push rod, whereby upon actuation of the push rod the piston moves the plunger through a pre-travel phase to a second last phase to momentarily operate the switch, continued movement of the push rod in the last phase forcing the piston to its limit of motion thereby overcoming the magnetic attraction between the permanent magnet and the member to release the piston and allow the plunger under its biasing means to return itself and the piston to their normal conditions.

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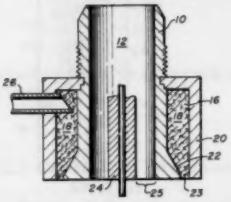
**4,166,940**

## DUAL-GAS SHIELDING METHOD

**John J. Barger, Ringgold, and Clarence W. Overby, Rossville, both of Ga., assignors to Combustion Engineering, Inc., Windsor, Conn.**

**Continuation of Ser. No. 670,928, Mar. 26, 1976, abandoned. This application Oct. 23, 1978, Ser. No. 953,811**
**Int. Cl.[2] B23K *9/16***
**U.S. Cl. 219—74** **2 Claims**



**1.** In the method of arc welding that includes shielding the plasma "bell" formed between a welding cup and a workpiece by forming at least two concentric gas shields by emitting from the welding cup gas streams which are physically separated until they leave the welding cup, the inner gas shield thereof comprising an inert gas, the improvement comprising:

a. forming an outer gas shield with a gas stream in which at least half the gas is air;

b. separating the outer gas shield from the inner gas shield at the exit of the welding cup such that the outer gas shield is kept beyond the outside of the plasma "bell" formed between the welding cup and the workpiece during welding; and

c. causing the outer gas shield gas stream to exit the welding cup at a velocity approximately equal to the inner gas shield gas stream velocity at the welding cup exit.

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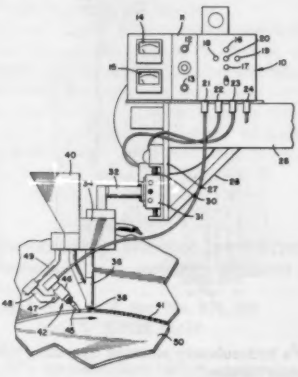
**4,166,941**

## GUIDANCE SYSTEM FOR ARC WELDER

**Shelby Cecil, Medina, Ohio, assignor to C.R.O., Inc., Menomonee Falls, Wis.**

**Continuation-in-part of Ser. No. 874,153, Nov. 5, 1969. This application Jul. 1, 1974, Ser. No. 484,859**
**Int. Cl.[2] B23K *9/12***
**U.S. Cl. 219—124.34** **13 Claims**



**1.** A guidance system for an arc welder including a welding

head comprising a probe, means moveably mounting the probe in the vicinity of the welding head, an actuating rod moveably mounted within the said probe, control means causing movement of said arc welder, first switching means sensing movement of the actuating rod and transmitting signals to the control means, motor means operatively attached to the probe and the welding head, second switching means resulting in direct movement of the probe upon activation, said second switching means manually activated by an operator, and circuit means actuating the said motor means in response to signals from said first and second switching means.

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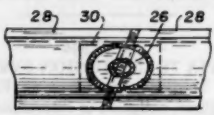
**4,166,942**

## REINFORCING WELDS FOR FLUID CONDUIT WRAPPING FOR VESSELS

**Bernhard Vihl, 2 Glenwood St., Clifton, N.J. 07011**

**Filed Mar. 22, 1978, Ser. No. 888,920**
**Int. Cl.[2] B23K *31/02***
**U.S. Cl. 219—137 R** **7 Claims**




1. An end-to-end weld joining of succeeding segments of a wrapping attached to a vessel wall to provide a heat transfer fluid conduit, the attached wrapping being configured transversely as a trough having a rounded central portion and outwardly curved edge portions and said joining being characterized by (1) a slanted end cut at an end of a given wrapping segment and a slanted, mating cut at the adjacent end of the succeeding wrapping segment, that slanted cut being from twenty to forty-five degrees to a plane transverse to the axis of the wrapping, (2) a substantially uniform spacing between the adjacent slanted cut ends of said wrapping segments and a welding together of those segments thereat to obtain a continuous fluid-tight joining with the slanted end interface and the joining providing a spreading of the expansion and contraction forces as heating and cooling fluids are fed sequentially through the fluid conduit, and (3) a metal outer reinforcement member ovoid in outer configuration with a throughgoing aperture furnishing a ring-like appearance curved to suit the outer radius of the rounded central portion of the conduit wrapping, further being substantially centered at said slanted end interface and of a width less than that of said rounded central portion thereby avoiding engagement with either of said outerwardly curved edge portions, and being attached to said wrapping as by welding around both its, said outer reinforcement's, inner and outer peripheries.

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**4,166,943**

## APPARATUS FOR WELDING LEAD WIRES TOGETHER

**Masaru Tanaka, Toyonaka, and Yoshimitsu Matsumoto, Hyogo, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

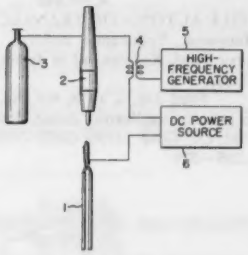
**Division of Ser. No. 693,846, Jun. 8, 1976, Pat. No. 4,091,259. This application Jun. 6, 1977, Ser. No. 803,434**
**Int. Cl.[2] B23K *9/32***
**U.S. Cl. 219—159** **8 Claims**

1. Apparatus for welding electrical lead wires together comprising:

a rotatable U-shaped block of electrically conductive material having a welding chamber therein, a wall of said block having an aperture for receiving said wires so that ends of said wires are disposed adjacent the open portion of said chamber and said wires are in electrical contact with said block;

a carbon electrode having an end thereof extending into the open portion of said chamber in alignment with said aperture;

means for applying a DC voltage between said electrode and said block to provide a predetermined arc-producing potential difference between the ends of said wires and said electrode when said wires are disposed as aforesaid,




so that when said wires are so disposed and the ends thereof are brought into contact with the end of said electrode, an electric arc is established therebetween within said welding chamber to weld said lead wires together; and

means for rotating said block to twist said wires together and to feed said wires toward said electrode.

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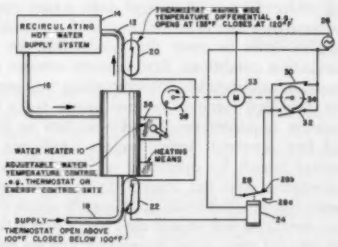
**4,166,944**

## WATER HEATER CONTROL SYSTEM

**Kenneth W. Scott, 601 9th St., Coronado, Calif. 92118**

**Filed Jul. 25, 1977, Ser. No. 818,967**
**Int. Cl.[2] H05B *1/02*; F24H *1/00*; G05D *23/00***
**U.S. Cl. 219—330** **4 Claims**




1. A water heater control system comprising:

(a) a water heater with a heating means and having a hot water outflow line and a cold water inflow line;

(b) an adjustable water temperature control device operatively connected to said water heater for controlling operation of said heating means;

(c) first temperature sensing means disposed in operable proximity to said outflow line and responsive to the temperature of said outflow line;

(d) a second temperature sensing meand disposed in operable proximity to said inflow line and responsive to the temperature of said inflow line;

(e) electrically operated water temperature control device setting means electrically coupled in circuit with both of said temperature sensing means and mechanically coupled to said water temperature control device, said setting means being,

(i) operable for setting said control device in an elevated temperature mode in response to the temperature in said outflow line reaching a predetermined low and the temperature in said inflow line dropping below a predetermined low; and

(ii) operable for setting said control device in a reduced temperature mode in response to the temperature in said inflow line exceeding said predetermined low and the temperature in said outflow line exceeding a separately predetermined level above said predetermined low.

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**4,166,945**

## VERSATILE AUTOMATIC TRANSACTION EQUIPMENT

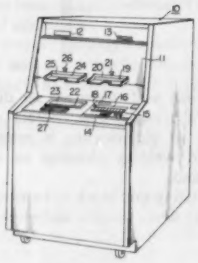
**Tadao Inoyama, Yokohama; Kokichi Aomori, Tokyo, and Hidekazu Terai, Kodaira, all of Japan, assignors to Hitachi, Ltd., Japan**

**Filed Jun. 2, 1978, Ser. No. 911,930**

**Claims priority, application Japan, Jun. 13, 1977, 52-68916**

**Int. Cl.[2] G06F *15/30*; G07F *7/08*; H04Q *9/00***

**U.S. Cl. 235—379** **7 Claims**



1. A transaction equipment comprising a basic module for executing basic transactions, at least one sub-module for executing sub-transactions, and means for interconnecting said basic module and said sub-module,

said basic module comprising: a first data bus for transmitting address data and control data; a user operation unit operated by a user in accordance with a transaction procedure in order to enter the information for setting the transaction conditions; first terminal control means connected to said data bus for controlling said user operation unit, said first terminal control means being operated in response to predetermined address data on the data bus, said first terminal control means producing selectively control signals for operating said user operation unit in accordance with the control data on the data bus, said means further selectively applying the status signals of the user operation unit to said data bus; a first article processing unit for processing transaction articles related to the basic transactions; second terminal control means connected to said data bus for controlling said first article processing unit, said second terminal control means being operated in response to a predetermined address on the data bus, said second terminal control means producing selectively control signals for operating said article processing unit in accordance with the control data on the data bus, said means further selectively applying the status signals for said article processing unit to said data bus; a first interface unit connected to said data bus for data communication with said sub-module; and a programmable microprocessor unit connected to said data bus, said programmable microprocessor unit including a program storage for storing a plurality of transaction sequence programs corresponding to types of transactions, and data storage for storing the data temporarily, said microprocessor receiving data on the data bus in accordance with the program and applying to said data bus the address data and control data for proceeding with the transaction operations;

said sub-module comprising: a second data bus for transmitting address data and control data; a second article processing unit for processing articles related to the subtrasactions; third terminal control means connected to said second data bus for controlling said second article processing unit, said means being operated in accordance with predetermined address data on said second data bus, said means selectively producing control signals for operating said second article processing unit in accordance with the control data on said second data bus, said means further applying selectively the status signals for said second article processing unit to said second data bus; a second interface unit connected with said second data bus for data communication with said basic module; and a second programmable microprocessor unit connected to said second data bus, said unit including a program storage for storing sub-programs and a data storage for temporarily storing data, said unit receiving the data on said second data bus in accordance with said sub-program in response to the data received from said second interface unit, said unit applying address data and control data for proceeding with the transaction operations onto said second data bus;

said basic module selectively supplying to said sub-module through said first and second interface units, data for predetermined operation of said sub-module.

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**4,166,946**

## DATA TRANSMISSION SYSTEM

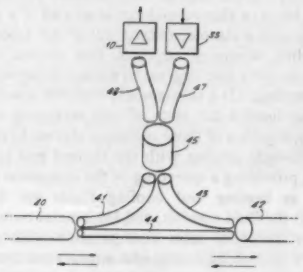
**Martin Chown, Harlow, and Jeffrey G. Farrington, Bishops Stortford, England, assignors to International Standard Electric Corporation, New York, N.Y.**

**Filed Jun. 8, 1977, Ser. No. 804,686**

**Claims priority, application United Kingdom, Jun. 29, 1976, 27029/76**

**Int. Cl.[2] G02B *5/14*; H04B *9/00***

**U.S. Cl. 250—199** **8 Claims**



1. A data transmission system, comprising:

a plurality of data terminals each having a receiving means and a transmitting means for respectively receiving data signals and transmitting data signals;

a plurality of optical fiber links each connecting the transmitting means of a data terminal to the receiving means of the next succeeding data terminal in the system;

each data terminal including means for coupling a portion of the optical power in the optical fiber link connected to the receiving means to the optical fiber link connected to the transmitting means;

means associated with each data terminal for storing data for transmission from said terminal; and

means for transmitting the data so stored during a predetermined transmission period.

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**4,166,947**

## TTL COMPATIBLE LED DRIVER CIRCUIT

**Jerome P. Dirksen, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.**

**Filed Nov. 10, 1977, Ser. No. 850,248**

**Int. Cl.[2] H04B *9/00*; H01S *3/10***

**U.S. Cl. 250—199** **7 Claims**

1. A circuit adapted for high frequency pulsed energization

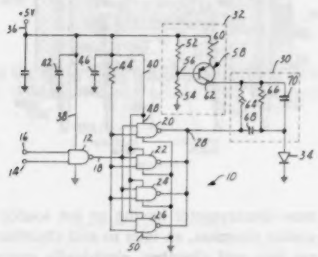
of a light emitting diode (LED) such as may be coupled to transmit light into an optical fiber providing a light transmission link in an optoelectronic telecommunications system, said circuit comprising:

(a) means for receiving TTL compatible digital input signals;

(b) means for providing a source of current to energize said LED;

(c) switch means coupled to said receiving means and having high and low digital output states to which it is switched in response to a said received TTL compatible signal; and

(d) means for coupling said current source providing means, said switch means and said LED such that current from said source is shunted through said switch means when in



its low digital output state to de-energize the LED and such that current from said source is coupled to energize the LED when said switch means is in its high digital output state, said coupling means including a pulse shaping network comprising a first resistor connected between said current source providing means and said switch means, a second resistor connected between said current source providing means and the LED and a capacitor connecting said switch means and the LED, the resistors and capacitor being selected to couple current pulses to energize the LED at a drive frequency up to 30 MHz such that the rise and decay times of the coupled pulses are sufficiently short to enable energization and de-energization of the LED at said drive frequency.

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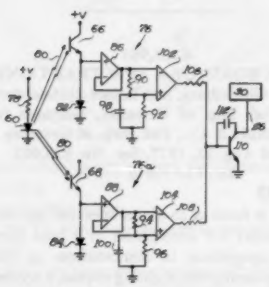
**4,166,948**

## SEED SENSOR

**David E. Steffen, Chatham, Ill., assignor to Dickey-john Corporation, Auburn, Ill.**

**Filed Dec. 1, 1977, Ser. No. 856,289**
**Int. Cl.² H01J *39/12***
**U.S. Cl. 250—214 B** **5 Claims**



1. In combination with a field seed planter having seed delivery conduit means associated with each row to be planted, seed sensor associated with each said conduit means comprising means forming a path of travel for the passage of seeds therethrough prior to said seed being planted, a source of light optically exposed to said path of travel and a light sensitive means optically exposed to said path of travel and to said light source for receiving light from said light source, and circuit means for effecting from said light sensitive means the emission of an electrical signal responsive to light incident thereon and a momentary change in said signal responsive to a momentary change in light level incident thereon due to passage of a seed between said light source and said light sensitive means, said circuit means including means coupled with said light sensitive means for maintaining a said momentary change in electrical signal substantially at a predetermined minimum value corresponding to said change in light level incident upon said light sensitive means, substantially regardless of any change of the level of light transmitted by said light source or received by said light sensitive means due to accumulation of dirt, dust or the like.

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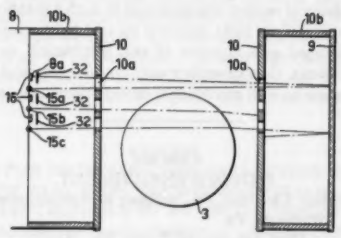
**4,166,949**

## APPARATUS FOR IDENTIFYING AND REGISTERING BOTTLES

**Jaan Pöld, Vällingby, and Karl-Bertil W. Wettersten, Västerhaninge, both of Sweden, assignors to Hugin Kassaregister Aktiebolag, Stockholm, Sweden**

**Filed Nov. 23, 1977, Ser. No. 854,238**
**Claims priority, application Sweden, Aug. 24, 1977, 7709515**
**Int. Cl.² G06M *7/00***
**U.S. Cl. 250—223 B** **10 Claims**



1. An apparatus for automatic identification and registration of bottles of different sizes and/or shapes advanced one after the other along a path, among which bottles of a high light transparency may be present, said bottles passing through the ray path of a light source-photocell arrangement forming a detector unit, the improvement being that the detector unit comprises a matrix having an array of photo cells in the lateral and in the vertical direction, each of said photo cells being actuable by a different and directed light ray, and being, by means of a programming unit, programmable to respond in predetermined patterns corresponding to the bottle types to be identified, a plurality of detecting operations being performed with respect to a pattern of light received by said laterally and vertically arrayed photo cells while a bottle is advanced a certain distance.

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**4,166,950**

## MECHANICAL MOTION DISPLACEMENT TO ELECTRICAL SIGNAL CONVERTER

**Jay Janzen, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Dec. 23, 1977, Ser. No. 864,123**
**Int. Cl.² G01D *5/34***
**U.S. Cl. 250—231 R** **9 Claims**

1. Apparatus comprising:

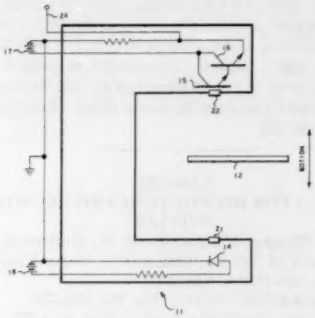
a light source;

a light sensing means capable of generating an electrical output signal representative of the intensity of the light beam from said light source received by said light sensing means;

a translucent light scattering member located between said

light source and said light sensing means in such a manner that the light beam from said light source must pass through said translucent light scattering member in order to reach said light sensing means;

means for moving said translucent light scattering member in a direction at least substantially parallel to the portion of the path of said light beam from said light source to said



light sensing means which is between said light source and said translucent light scattering member, in response to a mechanical motion displacement in such a manner that the intensity of the light received by said light sensing means is changed as a function of said mechanical motion displacement, thus changing said output electrical signal in response to said mechanical motion displacement.

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**4,166,951**

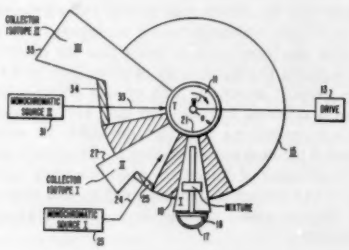
**ISOTOPE ENRICHMENT**

**Max Garbuny, Churchill, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Apr. 13, 1977, Ser. No. 787,235**

**Int. Cl.[2] H01J *35/34***

**U.S. Cl. 250—284** **12 Claims**



1. The method of deriving, from a first material a second material, said first material including an element having a plurality of isotopes, each isotope included in a different component of said material, said second material to be enriched in at least one of said isotopes, the said method comprising depositing said first material including said element at a subcritical surface density on a substrate, maintaining said substrate at a temperature just below the temperature at which the said first material escapes from said substrate, selectively irradiating said first material with monochromatic coherent radiation of a frequency resonant with the frequency of the component of said material including said one isotope to cause said second material including said one isotope to escape from said substrate, and collecting said escaping second material enriched in said one isotope.

**4,166,952**

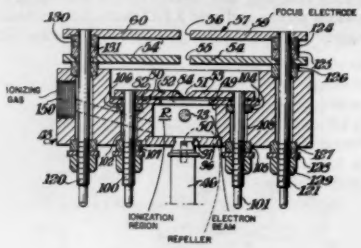
**METHOD AND APPARATUS FOR THE ELEMENTAL ANALYSIS OF SOLIDS**

**Bruce N. Colby, Carlsbad, and Charles W. Hull, Sierra Madre, both of Calif., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Feb. 24, 1978, Ser. No. 880,946**

**Int. Cl.[2] B01D *59/44***

**U.S. Cl. 250—288** **10 Claims**




1. In a mass spectrometer having an ion source which includes a vacuum chamber, an inlet to said chamber for introducing a gas into said chamber, electrically energized electrode means including a repeller electrode and an exit slit for withdrawing ions from said chamber through said slit to form an ion beam, a mass analyzer section for deflecting ions in the ion beam according to their mass, and detector means for detecting those ions within the ion beam which have been deflected by a given angle by the mass analyzer section, electron beam means for ionizing said gas, the improvement for the elemental analysis of solids comprising:

means for introducing an ionizing gas into said chamber through said inlet;

means to evacuate said chamber to an ion sputtering pressure in the presence of said ionizing gas;

means to apply a potential to said repeller electrode that is negative with respect to said slit;

a probe that may be removably introduced into said chamber;

means for mounting said repeller electrode on said probe so that ions of said ionizing gas impinge on said repeller electrode for sputtering particles from its surface into the interior of said chamber whereby some of said sputtered particles, which are neutral in charge and in the vicinity of said slit become ionized by charge exchange with said ionizing gas and pass through said slit.

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**4,166,953**

**ADAPTOR IN FORM OF A SPECTRAL CONVERTER**

**Josef F. Menke, Glücksburg, and Rainer Hofmeister, Bammental, both of Fed. Rep. of Germany, assignors to Industrie Automation GmbH & Co., Fed. Rep. of Germany**

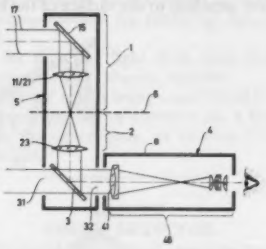
**Filed Aug. 22, 1977, Ser. No. 826,452**

**Int. Cl.[2] H01J *31/49***

**U.S. Cl. 250—333** **10 Claims**

1. An adaptor in form of an afocal spectral converter operating as a ray divider for conversion of a heat picture into a visible picture comprising in combination: an existing first device including aiming and sighting means, a second auxiliary device representing adaptor means optically connected to said existing first device and including a receiving unit for receiving infrared rays defining a heat picture and also including a visible picture reproducing unit, the entire system having an enlargement ratio of 1:1, means for connecting said second auxiliary device to said existing first device in such a way that an axis of the path of the rays entering the receiving unit of said second

auxiliary device is situated eccentrically but substantially parallel to the optical axis of said existing first device, and means



for imaging the parallel ray bundle leaving said picture reproducing unit without affecting said existing first device.

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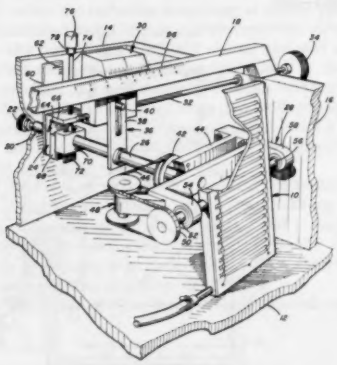
**4,166,954**

## INSTRUMENT FOR DETERMINING INFRARED BEAM VERGENCE

**Rex W. Goranson, Placitas, N. Mex., assignor to II-VI Incorporated, Glenshaw, Pa.**

**Filed Oct. 7, 1977, Ser. No. 840,403**
**Int. Cl.² G01J *1/00***
**U.S. Cl. 250—338** **14 Claims**



1. An instrument for determining the vergence of an infrared beam comprising:

A. a wedged shear plate:

B. a detector for receiving the interferometric modulation of the beam;

C. means for simultaneously rotating and tilting the detector to locate the interferometric fringes;

D. means to translate the detector to maximize the sensitivity of the detector to the beam;

E. means for reading the vergence of the beam; and

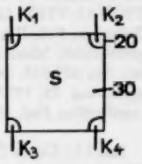
F. means for reading effectiveness of detector translation, rotation and tilt to match the interferometric fringe pattern.

**4,166,955**

## RADIATION DETECTOR AND METHOD OF OPERATING THE SAME

**Hansjürg Keller, Männedorf, Switzerland, assignor to Cerberus AG, Männedorf, Switzerland**

**Filed Mar. 30, 1978, Ser. No. 891,902**
**Claims priority, application Switzerland, Jun. 24, 1977, 7760/77**
**Int. Cl.² G01J *1/00***
**U.S. Cl. 250—342** **19 Claims**




1. A radiation detector comprising:

at least one radiation sensitive element for delivering an electrical signal in accordance with electromagnetic radiation impinging thereat;

said radiation sensitive element having more than two electrical contacts;

a multiplier device for multiplying at least two partial signals each appearing between two of the contacts; and

said multiplier device delivering an output signal if both of said two partial signals are present at the same time and delivering no output signal if at least one of said partial signals is absent, in order to eliminate the effects of noise signals occurring between given pairs of said contacts.

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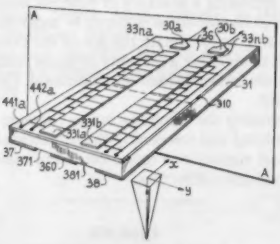
**4,166,956**

## DEVICE FOR DETECTING THE DEFLECTION SIGNAL OF THE ELECTRON BEAM GENERATED BY AN ELECTRON-GUN IN AN OSCILLOSCOPE

**Jean Fraleux, Paris, France, assignor to Thomson-CSF, Paris, France**

**Filed Dec. 29, 1977, Ser. No. 862,402**
**Claims priority, application France, Dec. 23, 1976, 76 38892**
**Int. Cl.² G01T *1/22***
**U.S. Cl. 250—370** **12 Claims**



1. A device for detecting the deflection signal of the electron beam produced by an electron-gun comprising:

a target on a semiconductor material substrate and means for scanning said target by the electron beam, said target comprising upon one of its faces a series of semiconductor elements generating electrical charge carriers under the effect of bombardment by the electron beam, said semiconductor elements, considered in the direction of scanning of the beam, forming an array of elementary generators,

means for reading out sequentially said elementary generators, said array of elementary generators comprising, superimposed in the direction of deflection of the beam and perpendicular to the direction of scanning of the

beam, two rows of elementary generator means, the rows being separated by a zone which is insensitive to the high-energy electron beam when said latter is focussed on said zone in the quiescent state, said means for reading out sequentially said elementary generators realizing a delayed read-out of said generators and furnishing in operation the information from the corresponding elementary generator to a common load.

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**4,166,957**

## APPARATUS AND METHOD FOR PRODUCING A SECTIONAL VIEW OF A BODY

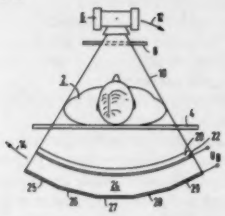
**Ottomar Jäntsch, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany**

**Continuation of Ser. No. 639,915, Dec. 11, 1975, abandoned. This application Aug. 25, 1977, Ser. No. 827,839**

**Claims priority, application Fed. Rep. of Germany, Dec. 17, 1974, 2459665**

**Int. Cl.[2] G01N *23/00***

**U.S. Cl. 250—445 T** **12 Claims**



1. In a method for producing a sectional view of a body in which the picture elements are derived from the absorption of ionizing rays going through the corresponding body element in a cross-sectional plane in different directions with the degree of absorption converted into electrical signals and the signals evaluated to develop outputs which are then provided to a display device, the improvement comprising:

(a) irradiating the body of which a sectional view is to be produced with a fan shaped beam of radiation arranged to penetrate the body in the cross sectional plane to be examined;

(b) disposing a vacuum image converter including a scintillator and photo-cathode behind the body as a receiver to detect the degree of absorption, said vacuum image converter including a plurality of detector units disposed side by side in the sectional plane to be measured in a polygonal form to approximate the arc of the circle, each detector unit comprising a plurality of space resolving semiconductor detectors formed on a common, thin semiconductor body;

(c) accelerating the electrons in the vacuum; and

(d) multiplying and converting the accelerated electrons into electrical signals in a space resolving manner using said semiconductor detectors.

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**4,166,958**

## X-RAY FILM CASSETTE

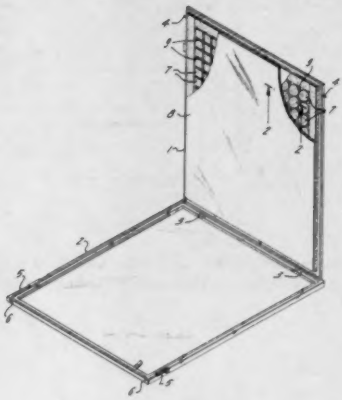
**Heinz Haselbarth, Glendale, N.Y., assignor to GAF Corporation, New York, N.Y.**

**Filed Jan. 5, 1978, Ser. No. 867,041**

**Int. Cl.[2] G03D *13/08***

**U.S. Cl. 250—480** **3 Claims**

1. An X-ray film cassette comprising a rectangular body having a front wall, a pair of side walls and a back wall; a rectangular cover secured at one side thereof to the back wall of said body by hinge means; a first pair of latch means provided at the sides of said cover and a second pair of latch means attached to the body to mate with the first pair, said secured latch means being manually operable to be moved from a latching position to a released position; a pair of slots provided in the front wall of the body to operate said secured latch means of the body; a cushion pad made of elastic material attached to the inner surface of the cover; a first intensifying sheet attached to the surface of the cushion pad; and a second intensifying sheet attached to the surface of the body; wherein



the improvement comprises a number of air channels parallel to the cover provided in said cushion pads and a convex cover, convex to the inside of the cassette having a contour represented by concentric elliptical contour lines whose center is located at the center of the rectangular cover.

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**4,166,959**

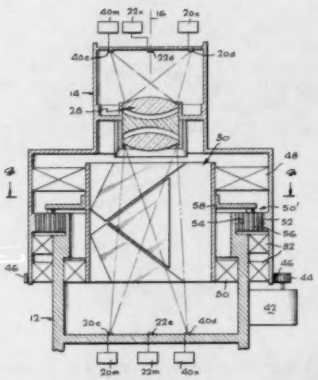
## MULTI-CHANNEL ROTATING OPTICAL INTERFACE FOR DATA TRANSMISSION

**Charles V. Ivie, Hesperia, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics & Space Administration, Washington, D.C.**

**Filed Aug. 25, 1977, Ser. No. 827,464**

**Int. Cl.[2] G02B *27/00***

**U.S. Cl. 250—551** **6 Claims**



1. Apparatus for transmitting data between two bodies which rotate relative to one another about at least one predetermined axis, comprising:

image rotating means disposed along said axis;

a plurality of pairs of light elements, each pair including a light emitter element and a light detector element disposed beyond opposite ends of said image rotating means, the elements beyond opposite ends of said image rotating means arranged in the same pattern and mounted on different ones of said bodies to rotate therewith about said axis;

a plurality of emitter drivers each coupled to a corresponding light emitter element for driving it to produce modulated light representing data;

a plurality of receivers each coupled to a corresponding light detecting element for receiving data signals therefrom; and

lens means for directing light from each emitter element onto a corresponding detector element;

said image rotating means being constructed to derotate the image of each pattern of elements on a body, which is formed on the other body, as relative rotation occurs about said axis.

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## 4,166,960
## SMOKE DETECTOR

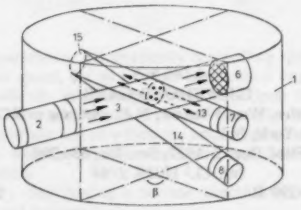
**Ernst Meili, Küsnacht, Switzerland, assignor to Cerberus AG, Männedorf, Switzerland**

**Filed Dec. 7, 1977, Ser. No. 858,397**

**Claims priority, application Switzerland, Dec. 23, 1976, 16178/76**

**Int. Cl.[2] G01N *21/26***

**U.S. Cl. 250—574** **30 Claims**




1. A smoke detector comprising:

a radiation source producing a directed radiation beam;

a scattered radiation-receiver arrangement having directional characteristics for receiving radiation transmitted by said radiation source;

an evaluation circuit operatively connected with said scattered radiation-receiver arrangement for delivering a signal when the radiation scattering at smoke particles in the radiation beam exceeds a predetermined value;

at least any one of said radiation source and said scattered radiation-receiver arrangement have such a directional characteristic and said evaluation circuit being structured such that radiation received from two fields of view of the scattered radiation-receiver arrangement, which fields of view are located differently relative to the radiation beam, can be compared with one another;

both of the fields of view have a markedly different proportion of scattered radiation, but at least take-up approximately the same spurious radiation from a background constituted by wall means having essentially the same surface properties so as to produce at least approximately the same spurious radiation; and

both of said fields of view being aligned towards said background.

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## 4,166,961
## METHOD AND APPARATUS FOR DETECTING A BLOOD LEAK IN A HEMODIALYSIS SYSTEM

**Naim G. Dam, New York, and John P. Hufnagel, Mamaroneck, both of N.Y., assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Mar. 22, 1978, Ser. No. 888,859**

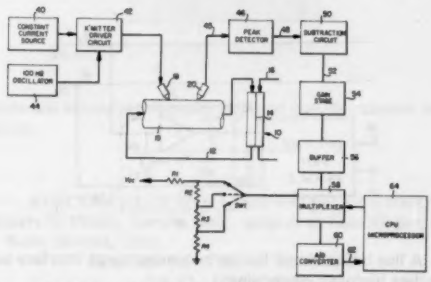
**Int. Cl.[2] G01N *21/26***

**U.S. Cl. 250—573** **10 Claims**

6. A sensor system for detecting the presence of blood in a conduit through which a dialysate solution flows for performing artificial kidney hemodialysis comprising:

an optical transmitter connected on one side of said conduit for transmitting a narrow beam of light into said dialysate solution at a predetermined angle of incidence relative to an axis normal to said central axis;

an optical receiver connected to said conduit on the same side thereof as said transmitter in substantially the same plane and at a predetermined angle of reflection relative to said normal axis for receiving reflected light from said dialysate solution, said angle of reflection being substantially equal to said predetermined angle of incidence;




means for intermittently passing pulses of direct current through said optical transmitter at a relatively low frequency with a pulse width being at least substantially equal in duration to the time separation between pulses;

means for detecting the output of said optical receiver;

means for generating an output DC signal responsive to the average DC level of said detected output; and

means responsive to said output DC signal for providing an output alarm signal when said output DC signal exceeds a predetermined level.

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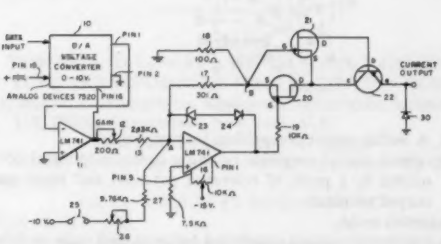
## 4,166,962
## CURRENT MODE D/A CONVERTER

**James G. Woodward, Natick, Mass., assignor to Data General Corporation, Southboro, Mass.**

**Filed Aug. 26, 1977, Ser. No. 828,429**

**Int. Cl.[2] H03K *5/08*; G06G *7/12***

**U.S. Cl. 307—237** **11 Claims**




1. A device comprising a controlled field effect transistor having source and drain terminals, and means coupled between said field effect transistor source and drain terminals for limiting the voltage across said source and drain terminals of said field effect transistor to a predetermined voltage which cuts off current flow in said means in order to limit the power dissipated by said field field effect transistor.

**4,166,963**

## BUFFER CIRCUIT FOR A DATA HIGHWAY

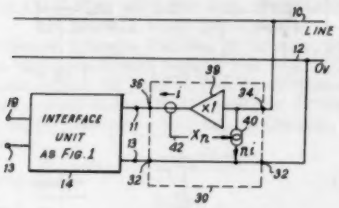
**Eric Metcalf, Ropley, England, assignor to The Solartron Electronic Group Limited, Farnborough, England**

**Filed Sep. 21, 1977, Ser. No. 835,257**

**Claims priority, application United Kingdom, Sep. 30, 1976, 40661/76**

**Int. Cl.² H03K** *5/00*

**U.S. Cl. 307—260** **8 Claims**




1. A line buffer circuit for use in connecting an interface unit to a data highway comprising:

a common signal ground terminal,

a highway terminal connected to an interface unit terminal through a voltage amplifier,

a controller responsive to the current flowing through said interface unit terminal,

a controlled current sink coupled between said highway terminal and said ground terminal, said current sink being responsively coupled to said controller,

said controller causing said current sink to conduct a current proportional to said current flowing through said interface unit terminal.

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**4,166,964**

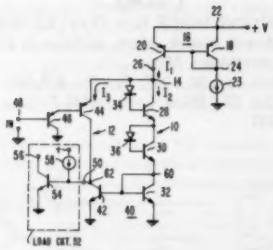
## INVERTING BUFFER CIRCUIT

**Adel A. A. Ahmed, Annandale, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed Dec. 8, 1977, Ser. No. 858,784**

**Int. Cl.² H03K** *17/00, 1/00*

**U.S. Cl. 307—296 R** **7 Claims**




1. A buffer circuit comprising, in combination:

a current mirror amplifier having a common terminal connected to a point of reference potential and input and output terminals;

a circuit node;

a first branch circuit connected between said node and the input terminal of said current mirror amplifier, said first branch circuit including means responsive to current flow therethrough for developing across said branch circuit a voltage at a given level;

a second branch circuit connected between said circuit node and said output terminal of said current mirror amplifier, said second branch circuit including the emitter-to-collector path of a transistor, said transistor being connected at its emitter electrode to said node and said transistor having also a base electrode and a base-emitter junction;

a buffer circuit input terminal to which an input signal may be applied coupled to said base electrode;

a buffer circuit output terminal, at which the buffer circuit output signal is available, at the output terminal of said current mirror amplifier; and

a constant current source supplying a constant current to said node, whereby when said input signal is greater than a given threshold level, said constant current steers mainly into said first branch circuit, and when said input signal is lower than a given level, said constant current steers mainly into said second branch circuit.

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**4,166,965**

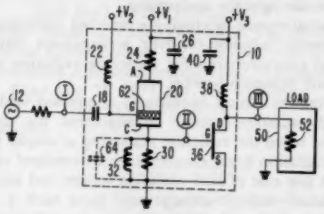
## THRESHOLD GATE

**Walter R. Curtice, West Windsor, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed Dec. 2, 1977, Ser. No. 856,794**

**Int. Cl.² H03K** *3/64*

**U.S. Cl. 307—299 R** **13 Claims**




1. A threshold gate circuit comprising in combination:

a transferred electron logic device (TELD) having an anode terminal to which a bias signal is applied, a cathode terminal at which an output signal is produced and a gate terminal to which an input signal is applied, said TELD, when biased having a quiescent mode and a domain formation mode;

means coupled between said anode and cathode terminals for biasing said TELD at a voltage below its threshold voltage;

an active device having transconductance value $G_m$ coupled in cascade with said TELD at one of said anode and cathode terminal for producing an output signal having one value when said TELD is in its domain forming mode and having a different value when said TELD is in its quiescent mode, said signal being adapted to drive a load of resistance $R_L$ where $G_m > 1 \div R_L$;

means coupled to said gate terminal and adapted to receive an input signal which if below a predetermined threshold value causes said TELD to remain in its quiescent mode and if above said threshold value causes said TELD to produce said domain formation whereby an input signal less than said threshold value corresponds to an output signal at said one value and an input signal above said threshold value corresponds to an output signal at said different value.

4,166,966

## ROTARY PULSE GENERATOR FOR AUTOMATIC ENGINE IGNITION ADVANCE AND RETARD

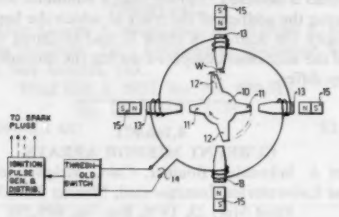
Karl F. Wittlinger, Schwieberdingen, and Jörg Issler, Stuttgart, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Nov. 9, 1977, Ser. No. 849,943

Claims priority, application Fed. Rep. of Germany, Nov. 12, 1976, 2651658

Int. Cl.[2] H02K *39/00*

U.S. Cl. 310—111 5 Claims




1. Apparatus for automatically controlling spark-timing shift by engine speed, for an internal-combustion engine, operating by periodically producing a train of at least two successive pulses of which each except the last is smaller than the next in peak amplitude and in which the amplitude of all of the pulses increases with the repitition rate, said apparatus comprising, in combination:

a rotary shaft having a normal direction of rotation driven by said engine;

a plurality of pick-up coils disposed around the shaft for responding to the variation in magnetic reluctance in a magnetic circuit including the shaft and the interior of the respective coil, said coils being connected in series;

an array of radially disposed ferromagnetic means including a ferromagnetic tooth aligned with each of said pick-up coils and radial members rotatable with said shaft of at least two different lengths so as to produce different minima of air gap between member and tooth as said shaft rotates, each of said teeth being equally spaced from said shaft and disposed so as to have the same clearance as each other tooth upon closest approach of the same radial member, whereby each coil produces a repeating train of waves of ascending magnitude as said shaft rotates in its normal direction, and

a threshold switch connected to the combined output of said pick-up coils and operating at a voltage threshold such as to be triggered by the greatest in amplitude of the waves of said train of waves at low speeds of said shaft and by the lowest in amplitude of said waves of said train at high speeds of said shaft, the output of said threshold switch being connected so as to control the ignition timing of an internal combustion engine.

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4,166,967

## PIEZOELECTRIC RESONATOR WITH ACOUSTIC REFLECTORS

Ewald Benes, and Dieter Hammer, both of Vienna, Austria, assignors to Hans List, Graz, Austria

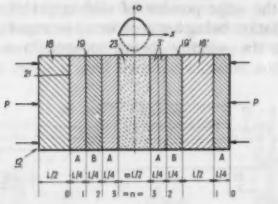
Filed Oct. 18, 1977, Ser. No. 843,215

Claims priority, application Austria, Oct. 19, 1976, 7782/76

Int. Cl.[2] H01L *41/10*

U.S. Cl. 310—338 11 Claims

1. A piezoelectric resonator for pressure, acceleration, and temperature sensors comprising a resonator core having holding discs on its opposite sides, said holding discs being formed of solid body layers, the dimensions of said layers measured in the direction of propagation of the piezoelectric stimulated sound wave each are $\frac{1}{4}$ or an odd multiple of $\frac{1}{4}$ of the length L of the sound waves in the respective layer corresponding to the resonance frequency of the resonator core, said holding discs being acoustic reflectors, said layers consisting alternatively of



materials having significantly different specific acoustic impedance.

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4,166,968

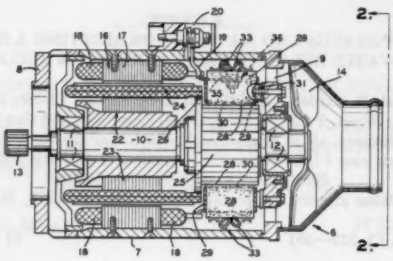
## ELECTRICALLY ISOLATED BRUSH HOLDER

Robert N. Prittie, Aurora, Ohio, assignor to Lear Siegler, Inc., Santa Monica, Calif.

Filed Jul. 14, 1977, Ser. No. 815,504

Int. Cl.[2] H02K *13/00*

U.S. Cl. 310—239 8 Claims



1. An improved dynamoelectric machine of the type having a housing, a rotatable commutator within the housing, a brush which contacts the commutator, an electrically conductive brush holder attached to the housing and supporting the brush, a brush pigtail connected to the brush, and a lead for connection with the pigtail at a junction, wherein the improvement comprises an assembly attached to the brush holder which supports the junction between the brush pigtail and the lead of a stator, said support assembly including a first insulator which electrically isolates the junction from the brush holder and a second insulator which electrically isolates the pigtail from the brush holder.

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4,166,969

## TARGET AND TARGET ASSEMBLY FOR A CAMERA TUBE AND METHOD OF MANUFACTURING SAME

Arthur M. E. Hoeberechts, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 22, 1977, Ser. No. 808,786

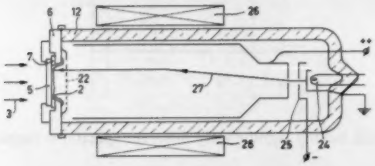
Claims priority, application Netherlands, Jun. 29, 1976, 7607095

Int. Cl.[2] H01J *29/45, 29/02;* H04N *9/07*

U.S. Cl. 313—371 7 Claims

1. A camera tube having a radiation permeable window and a semi-conductor target comprising a radiation sensitive-layer having a central portion of given thickness for converting radiation into electrical signals, a radiation permeable electrode on a side of the target exposed to incident radiation, said target having a monocrystalline edge portion thicker than the central radiation sensitive portion, said thicker edge portion having a circuit integrated therein which includes a semi-conductor element for processing electrical signals originating

from the permeable electrode, said permeable electrode being d-c connected to an input of the integrated circuit, an annular, electrically insulating support for said semi-conductor target, the side of the edge portion of said target remote from the incident radiation being secured in a vacuum-tight manner to the support, the window being secured in a vacuum-tight




manner to said thicker edge portion and overlapping the inner edge of the annular support, and connections of the outputs and leads of the integrated circuit necessary for supply and control voltage being connected to conductive layers extending at least partly outside the window on said thicker edge portion and having connection conductors outside the window.

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**4,166,970**

## APPARATUS AND METHOD FOR SHIFTING A HEAD MOVABLE RELATIVE TO A CARRIER FOR RECORDED INFORMATION

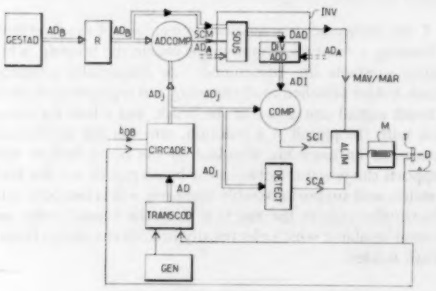
**Claude R. Cardot, Paris; Gérard E. Democrate, Plaisir; Jacques P. Droux, Paris; André J. Oisel, Elancourt, and Guy Prival, Mennecy, all of France, assignors to Compagnie Internationale pour l'Information Cii Honeywell Bull, Paris, France**

**Filed Dec. 23, 1976, Ser. No. 753,809**

**Claims priority, application France, Dec. 24, 1975, 75 39654**

**Int. Cl.[2] G05B *13/00***

**U.S. Cl. 318—561** **11 Claims**




1. A method of shifting a head which is movable relative to a carrier for recorded information carried by a plurality of recording tracks, the addresses of the tracks being recorded on the carrier in a plurality of reference zones at least equal in number to the tracks, each track being associated with at least one zone, the head being moved by an electric motor and reading the information, the head being shifted from a starting track A to a destination track B, the addresses of which are supplied by an address handling circuit, comprising accelerating the head from track A to track C by feeding the motor with a constant current, from track A to a track C at which the current is reversed, track C being between tracks A and B, decelerating the head when it reaches track C by reversing the current supplied to the motor, wherein the addresses of the tracks are recorded in reflected binary code, calculating the address of track C as a function of the addresses of tracks A and B, expressing addresses A, B and C in weighted binary code, storing the addresses of the tracks read in reflected binary code by a reading member when a shift occurs, the reading head being capable of being positioned and arranged relative to the recorded track addresses so that the initial recorded track address can be ambiguously read in reflected binary code either as the correct address for the initial track or the address of the track adjacent the correct initial track, decoding the stored reflected binary code into weighted binary code indicative of the correct initial address despite existence of the ambiguity, comparing the decoded addresses with the calculated address of track C while the head is accelerated from track A to track C by the constant current, decelerating the head from track C with the reversed current until the speed of the head is detected as lower than a minimum threshold Vo, comparing the address of the track at which the head comes to a halt with the address of track B, and initiating a fresh shift made if the addresses compared during the immediately previous step differ.

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**4,166,971**

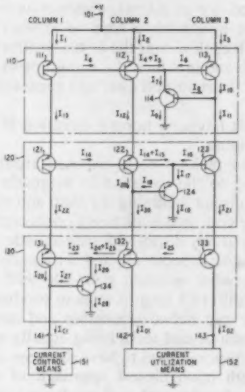
## CURRENT MIRROR ARRAYS

**Herbert A. Schneider, Boulder, Colo., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Mar. 23, 1978, Ser. No. 889,292**

**Int. Cl.[2] G05F *3/08***

**U.S. Cl. 323—4** **7 Claims**




1. An arrangement including at least first, and second current mirrors each having at least first and second controlled semiconductor devices, each such device having first, second and third terminals, the first terminals of which controlled devices are interconnected, each current mirror having control means connected to the third terminal of the first controlled device for providing current to the first terminals of the controlled devices, which current mirrors are connected in a cascode configuration, the arrangement further comprising,

additional current mirrors to total with the first and second current mirrors (m+n), where m and n are nonzero integer values the sum of which is greater than two, each current mirror having additional controlled semiconductor devices to total with the first and second controlled semiconductor devices (m+n), the first terminals of which controlled devices in each current mirror are interconnected,

means for connecting the additional current mirrors in a cascode configuration with the first and second current mirrors wherein the third terminal of the controlled devices in each current mirror except the last are each connected to different ones of the second terminals of the controlled devices in a subsequent current mirror to form (m+n) columns of (m+n) series controlled devices, and

means connecting the control means of each current mirror to the third terminal of each of m controlled devices

thereof, which m control means connections are arranged differently in each current mirror so that each column contains a different set of m third terminals with control means connections for precisely correlating the magnitude of currents in each column in proportion to $g^4$, the m third terminals with control means connections in the last current mirror being input current terminals.

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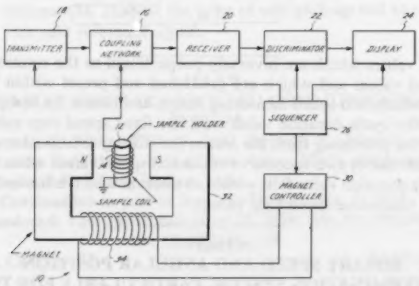
**4,166,972**

## NMR DISCRIMINATION APPARATUS AND METHOD THEREFOR

**James D. King; George A. Matzkanin, and William L. Rollwitz, all of San Antonio, Tex., assignors to Southwest Research Institute, San Antonio, Tex.**

**Filed Oct. 5, 1977, Ser. No. 839,519**
**Int. Cl.[2] G01R *33/08***
**U.S. Cl. 324—0.5 AC** **52 Claims**




1. Apparatus for detecting in a sample the presence of a first element in the presence of a second element which apparatus comprises:

(a) magnet means to produce a magnetic field acting on the comingled first and second elements which magnetic field has a specified intensity;

(b) RF coil means acting at right angles to the magnetic field acting on the sample;

(c) transmitter means connected to said RF coil means to produce a transmitted pulse burst of specified frequency, amplitude and duration acting on the sample;

(d) receiver means connected to said RF coil means which forms an output voltage proportional to the nuclear magnetic resonance response of the nuclei of the first element; and

(e) means for controlling the magnetic field intensity of said magnet means to achieve a level selected such that the resonant frequency of the first element in the nuclear magnetic resonance mode is approximately equal to the second element nuclear quadrupole resonance so that the NMR signal at said receiver means is enhanced.

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**4,166,973**

## METHOD AND SYSTEM FOR DETECTION OF THIN METAL LAYERS IN PACKAGED ARTICLES

**A. Clifton Lilly, Jr.; Francis M. Watson, III; Peter Martin, and John S. Price, all of Richmond, Va., assignors to Philip Morris Incorporated, New York, N.Y.**

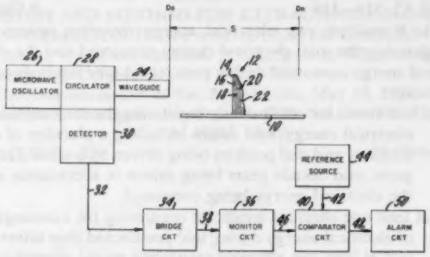
**Filed Mar. 7, 1978, Ser. No. 884,367**
**Int. Cl.[2] G01R *27/04***
**U.S. Cl. 324—58.5 B** **15 Claims**

1. In a method for detecting the presence or absence of radiant energy-reflective matter in an article, the steps of:

(a) generating radiant energy at a predetermined frequency;

(b) defining a location for issuance of such generated radiant energy and preselecting a distance range outwardly of such issuance location within which said article may be positioned during such detection; and

(c) propagating said generated radiant energy outwardly of said issuance location in pattern having a maximum characteristic value at said issuance location and a minimum




value in said distance range first exhibited at the outward end of said distance range.

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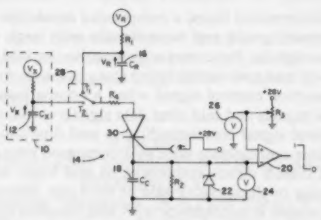
**4,166,974**

## APPARATUS AND METHOD FOR MEASURING CAPACITIVE ENERGY

**Stanley L. Vermeers, La Jolla, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Jan. 23, 1978, Ser. No. 871,733**
**Int. Cl.[2] G01R *27/26***
**U.S. Cl. 324—60 CD** **15 Claims**



1. Apparatus for determining whether or not an amount of energy in excess of a specified minimum of energy is stored in a capacitor of unknown capacitance, said apparatus comprising:

capacitive reference means having a selected capacitance for storing a reference amount of energy which is known to be no less than said specified minimum;

capacitive calibration means having a capacitance which is equal to the capacitance of said reference means, and which is selectively coupled to said capacitive reference means and to said unkown capacitor for providing a first voltage when said capacitive calibration means is coupled to said capacitive reference means, and for providing a second voltage when said capacitive calibration means is coupled to said unknown voltage; and

a comparator means calibrated by said first voltage for providing an indication signal when said unknown capacitor has stored an amount of energy exceeding said reference amount of energy.

## 4,166,975
## MULTIPLE RATE ELECTRICAL ENERGY METERING SYSTEM AND METHOD

**Warren R. Germer, Rochester, and Ansell W. Palmer, Hampton, both of N.H., assignors to General Electric Company, Somersworth, N.H.**

**Division of Ser. No. 724,041, Sep. 17, 1976, Pat. No. 4,050,020. This application May 18, 1977, Ser. No. 797,935**

**Int. Cl.[2] G01R** *15/08;* **G06F** *15/20*

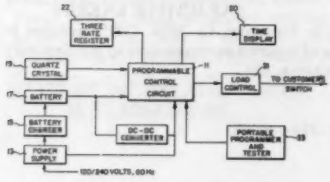
**U.S. Cl. 324—116** **9 Claims**

1. A multiple rate electrical energy metering system for registering the total electrical energy consumed and the electrical energy consumed during preselected time intervals comprising:

a first means for continuously registering the consumption of electrical energy, said means including a plurality of dial pointers, said dial pointers being driven by a set of decade gears, said decade gears being driven in accordance with the electrical energy being consumed,

at least one alternate means for registering the consumption of electrical energy during said preselected time intervals, said at least one alternate registering means comprising a plurality of dial pointers and decade gear means for driving said dial pointers, a clock means for generating real time signals,

a recirculating storage means for storing a plurality of time data signals corresponding to a plurality of predetermined times and for storing a plurality of function data signals corresponding to control functions to be performed at said




predetermined times, a comparator means for periodically comparing said real time signals with each of said time data signals, logic means responsive to said comparator means and said recirculating storage means for generating a function control signal when a comparison of said real time signals and said time data signals exists, said function control signal corresponding to said function data signals in time coincidence with said compared time data signals, and clutch means responsive to said logic means for engaging or disengaging said at least one alternate registering means in accordance with said function control signal, said clutch means including a first gear means continuously driven by the decade gears of said first means for continuously registering, a second gear means in continuous engagement with the decade gears of said at least one alternate means for registering, and means responsive to said function control signal for selectively engaging and disengaging said second gear means with said first gear means.

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## 4,166,976
## CIRCUIT FOR THE DIGITAL MEASUREMENT OF THE SPEED OF A MOVING OBJECT

**Gerhard Ruhnau, and Wolfgang Gudat, both of Hanover, Fed. Rep. of Germany, assignors to WABCO Westinghouse GmbH, Hanover, Fed. Rep. of Germany**

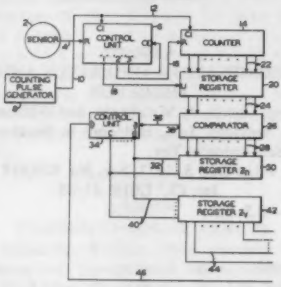
**Filed Nov. 16, 1977, Ser. No. 852,133**

**Claims priority, application Fed. Rep. of Germany, Nov. 24, 1976, 2653351**

**Int. Cl.[2] G01P** *3/48*

**U.S. Cl. 324—166** **14 Claims**

1. A circuit for digitally measuring the rotational speed of a moving part comprising, sensor means for producing a sensor signal having a frquency proportional to the rotational speed of the moving part, means for measuring the cycle duration value of the sensor signal frequency and for converting the cycle duration value to a representation of the rotational speed, wherein said means includes, means for storing rotational speed values which are graduated and preset within a predetermined speed measuring range, means for storing fixed speed




step values which are inversely porportional to the rotational speed values and which are graduated and preset within the predetermined speed measuring range, and means for comparing the cycle duration value with the fixed speed step values and for providing from the means for storing rotational speed values one of two successive rotational speed values when the cycle duration value falls within an interval which is limited by two successive speed step values.

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## 4,166,977
## ROTARY SPEED AND ANGULAR POSITION DETERMINATION SYSTEM, PARTICULARLY FOR THE CRANKSHAFT OF AN INTERNAL COMBUSTION ENGINE

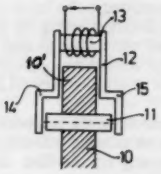
**Wolfram Glauert, Bamberg, and Helmut Klinger, Münchingen, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Aug. 11, 1977, Ser. No. 823,736**

**Claims priority, application Fed. Rep. of Germany, Sep. 16, 1976, 2641592**

**Int. Cl.[2] G01P** *3/66*

**U.S. Cl. 324—173** **13 Claims**




1. Combined rotary speed and angular position determination system, to determined the angular speed and the instantaneous angular position of a reference point of a rotating shaft, to provide both a speed signal and a reference signal representative, respectively, of the speed of the shaft and the predetermined angular position of the shaft,

comprising the combination of

a star wheel (10, 20) having a toothed circumference;

at least one reference element (11, 21) located on the star wheel and placed thereon at a predetermined angular position with respect to said reference point including a pin (11, 12) extending transversely through the wheel and parallel to the axis thereof;

a stationary electromagnetic pickup having a magnetic yoke (12, 14, 15) located in magnetically coupled relationship both with respect to the toothed circumference of the star wheel and the location of said reference element on the

star wheel when the reference element and the yoke are in angular alignment, the core or yoke being formed with extending arms (**14, 15**) reaching around the toothed edge portion of the wheel (**10**) and extending to face the end portions of the reference element pin (**11**) when the reference element is in a position opposite the pick-up,

the teeth and gaps of the star wheel and the yoke of the pick-up forming a first magnetic circuit,

the reference element and the yoke of the pickup forming a second magnetic circuit,

whereby the yoke will be common to both said magnetic circuits;

and means (**13**) deriving an electrical output signal from the yoke (**12, 14 15**) of said pick-up representative of the change in the magnetic reluctance of both said magnetic circuits to provide said speed signal as the first magnetic circuit changes its magnetic reluctance cyclically upon rotation of the shaft, thereby causing cyclical flux changes and having an additional characteristic representative of the additional change in the reluctance introduced by the second magnetic circuit upon passage of the reference element (**11, 21**) past the yoke of said pick-up and to provide said reference signal.

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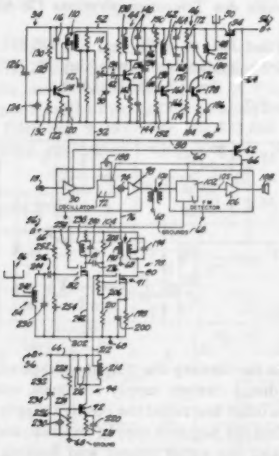
**4,166,978**

## TWO-WAY VOICE CONTROLLED COMMUNICATION SYSTEM

**Maynard E. White, Elkhart, Ind.; Kenneth E. Monroe, and Lindsey E. Waldorf, both of Ann Arbor, Mich., assignors to Maynard E. White, Elkhart, Ind.**

**Continuation-in-part of Ser. No. 720,652, Sep. 7, 1976, abandoned. This application May 25, 1978, Ser. No. 909,685**
**Int. Cl.[2] H04B** *1/38*
**U.S. Cl. 325—22** **14 Claims**



**1**. In a two-way voice controlled communication system including a transmitting circuit having a noise cancelling microphone, signal amplifying means connected to said microphone and transmitting antenna means; a receiving circuit including receiving antenna means, signal amplifying means and signal transducing means connected thereto, said receiving circuit being normally enabled and said transmitting circuit being normally disabled, the improvement comprising:

said signal transmitting circuit including switching means coupled to both said transmitting circuit and said receiving circuit,

said switching means responsive to the presence of an output signal from said microphone for enabling said transmitting circuit and disabling said receiving circuit;

said switching means further responsive to the absence of said output signal from said microphone for substantially immediately disabling said transmitting circuit and enabling said receiving circuit so that the system will receive signals even during short duration absences of transmissions thus providing two-way real-time voice controlled communication.

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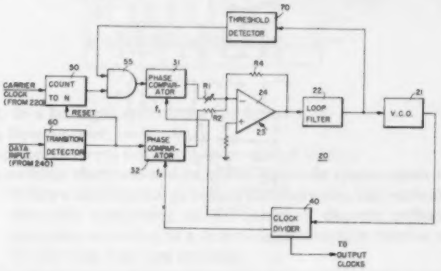
**4,166,979**

## SYSTEM AND METHOD FOR EXTRACTING TIMING INFORMATION FROM A MODULATED CARRIER

**William N. Waggener, Sarasota, Fla., assignor to Schlumberger Technology Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 684,604, May 10, 1976, abandoned. This application Jan. 12, 1978, Ser. No. 869,071**
**Int. Cl.[2] H04L** *15/24*
**U.S. Cl. 325—321** **53 Claims**




**1**. A system for extracting timing information from a received carrier signal modulated with digital symbols, the symbol rate being related to the carrier frequency, comprising:

a phase-locked loop including an oscillator and error signal generating means for controlling said oscillator;

means responsive to said carrier for generating a first signal at substantially the symbol rate; and

means responsive to symbol transitions for generating a second signal;

said error signal generating means being responsive to said first signal, said second signal and a signal derived from said oscillator for generating an error signal to control said oscillator.

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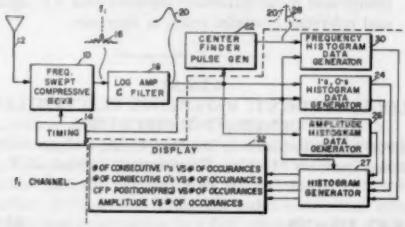
**4,166,980**

## METHOD AND APPARATUS FOR SIGNAL RECOGNITION

**John T. Apostolos, Merrimack, N.H., and Robert P. Boland, Malden, Mass., assignors to Sanders Associates, Inc., Nashua, N.H.**

**Filed Aug. 25, 1977, Ser. No. 827,521**
**Int. Cl.[2] H04B** *17/00*
**U.S. Cl. 325—363** **33 Claims**




**19**. Apparatus for establishing the type of modulation impressed on a signal comprising:

means for detecting a designated modulation-related condition of said signal,

means for correlating said designated condition with the amount of time said designated condition exists over a predetermined time period and,

means for determining the modulation type based on the correlation established by said correlating means.

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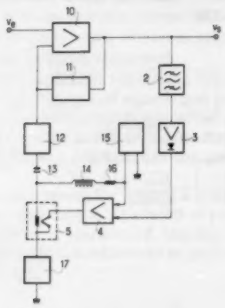
**4,166,931**

## CONTINUOUS SIGNAL AMPLITUDE REGULATOR

**Bernard Marchasson, St. Michel sur Orge, and Rene Migeon, Paris, both of France, assignors to Compagnie Industrielle des Telecommunications Cit-Alcatel, Paris, France**

**Filed Nov. 15, 1977, Ser. No. 851,677**
**Claims priority, application France, Nov. 23, 1976, 76 35218**
**Int. Cl.[2] H03F *3/66***
**U.S. Cl. 330—52** **6 Claims**



1. A continuous signal amplitude regulator, said signal including at least one pilot tone of fixed frequency, which comprises:

a variable gain quadripole through which is passed the signal to be regulated;

a main feedback loop for controlling the gain of said quadripole, said feedback loop including an automatic gain control circuit having components which include:

a bandpass filter for separating said at least one pilot tone from the signal to be regulated;

an amplifier-detector for detecting said filtered pilot tone thereby to produce a d.c. signal;

a source of a reference potential; and

a comparator for generating an output signal which is indicative of the difference between said reference potential and said d.c. signal;

a gain control circuit receiving said comparator output signal and controlling the gain of said variable gain quadripole, the amplitude regulator further comprising:

an auxiliary feedback loop through which said gain control circuit also controls the gain of a component in the main feedback loop so as to increase the gain of said component if the difference between said d.c. signal and said reference potential tends to increase and to decrease the gain of said component if the difference between said d.c. signal and said reference potential tends to decrease.

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**4,166,982**

## LOGICAL CIRCUIT REFERENCE ELECTRIC LEVEL GENERATING CIRCUITRY

**Warren A. Christopherson, San Jose, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.**

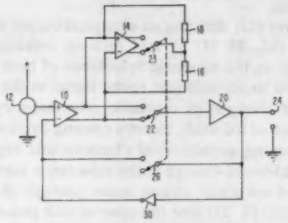
**Filed Jun. 30, 1978, Ser. No. 921,143**
**Int. Cl.[2] H03F *3/45***
**U.S. Cl. 330—259** **14 Claims**

1. Logical circuit reference electric energy level generating circuitry comprising

a differential amplifying circuit having one input terminal to which a primary reference potential is applied, having another input terminal and a pair of output terminals,

current flow evening circuitry including a differential amplifier having a pair of input terminals individually connected to said pair of output terminals of said differential amplifying circuit and having an output terminal to which electric energy dividing elements are connected in common and which are individually connected to said pair of input terminals of said differential amplifier circuit,

repeating circuitry having an input terminal connected to one of said output terminals of said differential amplifying



circuit and having an output terminal at which said electric energy level is delivered, and

a feedback lead connected between said output terminal of said repeating circuitry and said other input terminal of said differential amplifying circuit.

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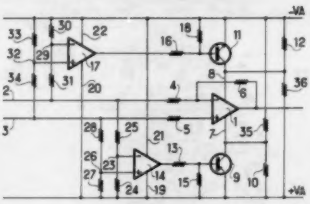
**4,166,983**

## CIRCUIT FOR LIMITING THE OUTPUT VOLTAGE OF AN AMPLIFIER

**Jean-Claude Lacroix, Longjumeau, France, assignor to Compagnie Industrielle des Telecommunications Cit-Alcatel, Paris, France**

**Filed Jun. 29, 1978, Ser. No. 920,897**
**Claims priority, application France, Jul. 21, 1977, 77 22354**
**Int. Cl.[2] H03F *3/04***
**U.S. Cl. 330—297** **7 Claims**

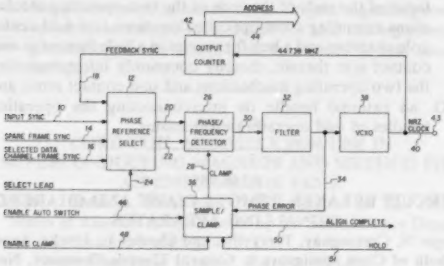


1. A circuit for limiting the output voltage of an amplifier having two direct current supply terminals, one positive in relation to the other and called the positive supply terminal and the other called the negative supply terminal, and at least one signal input and one signal output, said limiting circuit comprising at least one two-state bias circuit connected into the supply circuit of the amplifier in series with one of the supply terminals and providing the bias voltage to that supply terminal, the bias voltage in a first state being at a first value which is that required by the amplifier for normal working, and the bias voltage in a second state being at a second value which is closer than the first value to the bias voltage at the other supply terminal, and a threshold detector whose input is connected in parallel with that of the amplifier and which controls the state of the bias circuit in such a way that the bias circuit is in its second state for a range of variation of the input signal to the amplifier which, with the amplifier normally supplied, produces an output signal having a potential between the first and the second values.

## 4,166,984
## RESTRICTED RATE OF CHANGE PHASE LOCK LOOP APPARATUS

James R. Jenkins, Fort Worth, Tex., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed May 25, 1978, Ser. No. 909,737
Int. Cl.[2] H03B 3/04
U.S. Cl. 331—1 A 6 Claims




5. Control apparatus comprising, in combination:

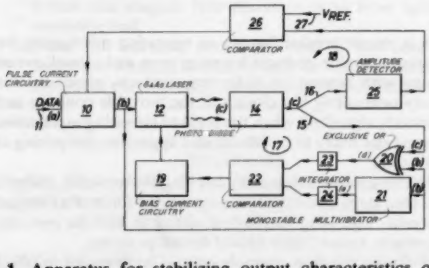
digital data signal lock loop means, including signal input means, for internally generating a first signal which is driven toward phase lock with respect to a second signal applied to said signal input means whenever said second signal changes a given characteristic with respect to the same characteristic of the first signal; and

limiting means, connected to said signal lock loop means outside the signal flow path from input to output of said signal lock means, for allowing said first signal to continue being driven toward phase lock while preventing the rate of change of said first signal from exceeding a chosen value.

## 4,166,985
## INJECTION LASER STABILIZATION

Brian R. White, and David R. Smith, both of Woodbridge, England, assignors to The Post Office, London, England

Filed Sep. 9, 1977, Ser. No. 831,860
Claims priority, application United Kingdom, Sep. 14, 1976, 38054/76
Int. Cl.[2] H01S 3/13
U.S. Cl. 331—94.5 S 13 Claims

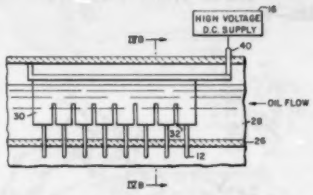



1. Apparatus for stabilizing output characteristics of an injection laser which has current supply means for supplying a d.c. bias current to the laser and drive circuitry for supplying current pulses to the laser, said apparatus comprising a detector for detecting a portion of the light output of the laser, said detector being arranged to convert the optical pulse train emitted by the laser into an electrical pulse train, first means for deriving from said electrical pulse train a first electrical signal whose magnitude is dependent upon the switch-on delay of the laser, second means for introducing a reference second electrical signal, comparing means for comparing said first and second electrical signals to produce a control signal which is applied to said current supply means, the current supply means being responsive to said control signal to adjust the d.c. bias level to maintain the switch-on delay substantially constant.

## 4,166,986
## BALLAST TECHNIQUE FOR LASER CATHODE PINS

Richard L. Hundstad, Wilkinsburg, and Steve A. Wutzke, Penn Hills, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 10, 1977, Ser. No. 805,369
Int. Cl.[2] H01S 3/097
U.S. Cl. 331—94.5 PE 4 Claims




1. In a laser gas system, the combination of:

a flowing laser gas medium;

optical elements forming a laser optical cavity;

a cathode electrode and an anode electrode spaced apart to define a laser discharge region therebetween, said cathode electrode comprising an X-Y array of discrete cathode elements; extending in a downstream direction relative to the flowing laser gas medium;

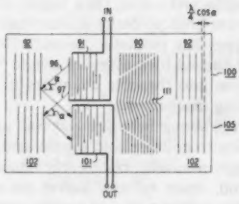
DC electrical excitation means operatively connected to said anode and cathode electrodes to initiate laser emission; and

a bulk resistive member physically isolated from said flowing laser gas medium and operatively coupling said discrete cathode elements of said cathode electrode to said DC electrical excitation means, said bulk resistive member being physically configured to effectively tailor the resistive characteristic of the bulk resistive member to produce a desired resistive pattern between the individual cathode electrode elements and the DC electrical excitation.

## 4,166,987
## SURFACE ACOUSTIC WAVE MULTISTRIP COUPLER

Larry A. Coldren, Holmdel, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Feb. 15, 1978, Ser. No. 877,838
Int. Cl.[2] H01P 5/18
U.S. Cl. 333—109 19 Claims




1. A surface acoustic wave (SAW) device comprising,

a substrate comprised of a material on which surface acoustic waves will propagate, and

a multistrip coupler disposed on said substrate for coupling surface acoustic waves having a predetermined energy profile and propagating in a first acoustic wave track on said substrate into surface acoustic waves having a desired energy profile and propagating in a second acoustic wave track on said substrate, respective portions of said coupler lying in said first and second tracks and the energy profile

of the waves in at least one of said tracks being nonuniform,

characterized in that the portion of said coupler lying in said one of said tracks is weighted to match said nonuniform energy profile.

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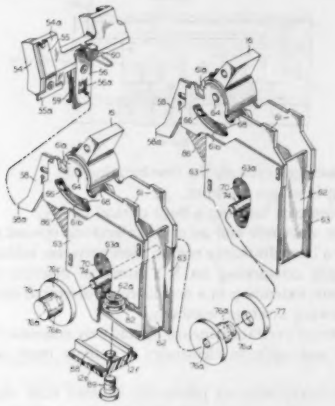
**4,166,988**

## COMPACT THREE-POLE CIRCUIT BREAKER

**Ronald D. Ciarcia, Plantsville, and Raymond K. Seymour, Plainville, both of Conn., assignors to General Electric Company, New York, N.Y.**

**Filed Apr. 19, 1978, Ser. No. 897,896**
**Int. Cl.[2] H01H** *73/06, 71/02*
**U.S. Cl. 335—9** **12 Claims**



1. An electric circuit breaker comprising, in combination:

A. an insulative case consisting of a base and a cover,

(1) said base including opposed sidewalls and two intermediate partitions serving to define longitudinally elongated, side-by-side right, center and left pole chambers;

B. a movable contact arm situated in each said pole chamber, each said arm mounting a movable contact at one end;

C. a pair of operating mechanisms respectively positionally mounted in laterally aligned interruptions provided in said intermediate partitions to locate one of said operating mechanisms between said right and center pole chambers and the other between said left and center pole chambers, each said operating mechanism including

(1) a frame, (2) a manual operating handle pivotally mounted by said frame and protruding through an opening in said cover, (3) a toggle consisting of upper and lower links pivotally interconnected by a knee pin, said upper link pivotally connected to said handle,

(4) a rod carried by said lower toggle link for transverse extension into the pole chambers to each side of said operating mechanism.

(5) a spring acting between said rod and said frame in a direction to collapse said toggle, and

(6) a trigger normally, releaseably retained in a reset position and, upon release, moves to a tripped position effecting collapse of said toggle under the urgence of said spring;

D. a separate trip unit situated in each said pole chamber for monitoring the current flowing therethrough,

E. a common trip bar extending transversely through said pole chambers in actuatable relation with each said trip unit, said trip bar carrying a pair of latch members for individually, releaseably retaining said trigger of each said operating mechanism in its reset condition, whereby the response of any one of said trip units to an overcurrent condition actuates said common trip bar to commonly release said triggers for individual movement to their tripped positions;

F. separate right, center and left pole insulative grommets having central bores for acceptance therein of the ends of said operating mechanism rods extending into said right and left pole chambers, and a hub for receipt in a hole formed in said movable contact arms situated in said left and right pole chambers, said center pole grommet having oppositely directed, blind central bores aligned for acceptance of the ends of the rods of the two operating mechanisms extending from opposite directions into said center pole chamber and a hub for receipt in a hole formed in said contact arm therein, thereby commonly interconnecting the two operating mechanisms and said contact arms; and

G. an external handle tie interconnecting the operating handles of said operating mechanisms.

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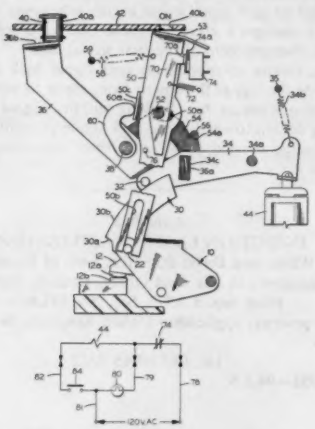
**4,166,989**

## CIRCUIT BREAKER REMOTE CLOSE AND CHARGED SIGNALLING APPARATUS

**Roger N. Castonguay, Terryville, and Charles L. Jencks, Avon, both of Conn., assignors to General Electric Company, New York, N.Y.**

**Filed Apr. 19, 1978, Ser. No. 897,612**
**Int. Cl.[2] H01H** *73/12, 73/14*
**U.S. Cl. 335—17** **10 Claims**



1. In a circuit breaker having an operating mechanism for translating movable contacts between open and closed circuit positions with respect to stationary contacts, apparatus for remotely controlling the closure of the movable contacts and for remotely signalling when the breaker operating mechanism is charged and ready to be closed, said apparatus comprising in combination:

A. latching means releaseably latching the movable contacts in their open circuit position against the force of a charged breaker operating mechanism acting to bias the movable contacts toward their closed circuit position;

B. a closing solenoid operable on said latch means to effect unlatching of the movable contacts, thereby enabling the charged operating mechanism to drive the movable contacts to their closed circuit position; and

C. breaker condition indicating means including an indicator arm mounted for movement under the joint control of said movable contacts and the breaker operating mechanism between first, second and third positions to respectively identify when the circuit breaker is open, charged and ready to close, and closed;

D. a first switch situated internally of the circuit breaker;

E. an actuating lever controllably positioned by said indicator arm to selectively actuate said switch to its closed

condition only when said indicator arm is in its second position identifying that the circuit breaker is charged and ready to be closed;

F. signalling means located externally of the circuit breaker;

G. a second switch located externally of the circuit breaker; and

H. external wiring interconnecting said first and second switches, said closing solenoid and said signalling means with a voltage source, whereby closure of said first switch completes an energization circuit for said signalling means and arms an energization circuit for said closing solenoid preparatory to its completion by closure of said second switch.

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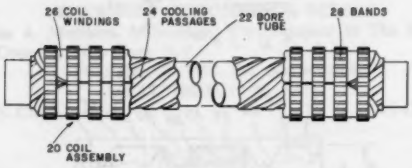
**4,166,990**

## CORE/COIL ASSEMBLY FOR USE IN SUPERCONDUCTING MAGNETS AND METHOD FOR ASSEMBLING THE SAME

**David A. Kassner, Patchogue, N.Y., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Aug. 12, 1977, Ser. No. 824,192**
**Int. Cl.[2] H01F** *1/00, 7/00, 7/22*
**U.S. Cl. 335—216** **11 Claims**




1. In a superconducting magnet of the focusing or bending type used in synchronous particle accelerators and having a core assembly and a coil assembly the improvement which comprises:

(a) magnet tube means having substantial longitudinal rigidity;

(b) core stack means having an axial bore, said stack means further comprising a plurality of carbon steel washer type laminations having a shape substantially conforming to the cross-section of said magnet tube means,

(c) means for holding said laminations as a compressed stack within said magnet tube means so as to form said core assembly; and,

(d) said coil assembly within the bore of said core stack means and forming an interference fit with the laminations thereof at the operating temperature of said magnet.

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**4,166,991**

## SOLENOID

**Lambert Haner, Rocky River, Ohio, assignor to Acme-Cleveland Development Company, Highland Heights, Ohio**

**Filed Oct. 19, 1977, Ser. No. 843,728**
**Int. Cl.[2] H01F** *3/00*
**U.S. Cl. 335—261** **26 Claims**

1. A solenoid comprising, in combination,

a magnetically permeable frame means having an axis,

a magnetically permeable movable armature coaxially disposed relative to said axis,

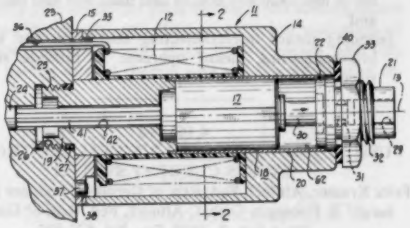
first pole piece means on said frame means,

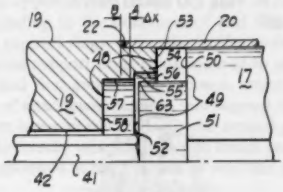
second pole piece means on said armature cooperable with said first pole piece means,

said armature having a first extended position with said first and second pole piece means separated from each other and having a second position with said first and second pole piece means relatively close together,

and magnetic field saturation means firstly, to saturate a flux carrying area of one of said pole piece means in some segment of the range of positions of said armature,

said saturation means including the pole piece means having shapes establishing secondly, a decrease in the saturation





of said flux carrying area and a corresponding increase of flux at said saturated flux carrying area between said first and second pole piece means as the armature continues its movement toward said second position.

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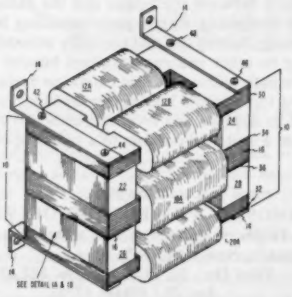
**4,166,992**

## SYMMETRICAL STRUCTURE FOR SHUNT CONTROLLED REGULATED TRANSFORMER

**Karl H. Brueckner; Charles A. Farel, and Paul Y. Hu, all of Boulder, Colo., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Aug. 4, 1977, Ser. No. 821,892**
**Int. Cl.[2] H01P** *27/30*
**U.S. Cl. 336—155** **5 Claims**



1. A regulating transformer comprising in combination:

a main core of essentially "O" shaped laminated construction for supporting primary and secondary coils;

a first and a second shunt core of essentially similarly shaped laminated construction to said main core, each supporting at least one control coil, one shunt core being positioned in spaced juxtaposed alignment on each side of said main core;

separate flux interconnecting means placed such that the magnetic flux from said main core travels at right angles

to said flux interconnecting means for interconnecting said main core and both of said shunt cores, said flux interconnecting means including a plurality of laminations oriented in a perpendicular relationship to the laminations of said main core and said shunt cores and also being operable to mechanically couple said main and said shunt cores; and

fastening means interconnecting said cores and said flux interconnecting means operable to provide structural strength to the transformer.

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**4,166,993**

## PUSH BUTTON ACTUATED BIMETAL CONTROLLED EXCESS CURRENT SWITCH

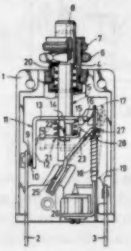
**Fritz Krasser, Altdorf, Fed. Rep. of Germany, assignor to Ellenberger & Poensgen GmbH, Altdorf, Fed. Rep. of Germany**

**Filed Feb. 7, 1978, Ser. No. 875,805**

**Claims priority, application Fed. Rep. of Germany, Feb. 15, 1977, 7704459[U]**

**Int. Cl.[2] H01H *71/16***

**U.S. Cl. 337—66** **3 Claims**



1. In a push button actuated, bimetal controlled, current overload switch capable of undergoing trip-free release and including a housing, a bimetal strip disposed in the housing, an angular contact bridge disposed in the housing and forming part of the current path provided by the switch, means pivotally and displaceably mounting the bridge in the housing, that means including a switching rod mounted in the housing for axial movement relative thereto and having one end extending out of the housing, a switching rod extension mounted at the other end of the rod and within the housing and arranged to bear against the bridge, and spring means disposed to maintain a spring force between the bridge and the extension, the improvement comprising an obliquely extending lever disposed in said housing, having one end pivotally secured to said housing, having its other end engaging said bimetal strip, and located in the path of travel of said extension during axial movement of said rod into said housing for enabling such movement of said rod to displace said lever in a direction to change said switch from a switched-on state to a switched-off state.

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**4,166,994**

## THERMOSTAT WITH POSITIVE OFF POSITION

**Harold A. DeRemer, Allentown, Pa., assignor to General Electric Company, New York, N.Y.**

**Filed Dec. 20, 1977, Ser. No. 862,351**

**Int. Cl.[2] H01H *37/52***

**U.S. Cl. 337—350** **21 Claims**

1. A thermostat comprising:

(A) a stacked blade assembly including

(1) a lower temperature responsive bimetal blade,

(2) a conductive intermediate stiff spring blade, and

(3) a conductive upper flexible spring blade which is less stiff then the stiff spring blade,

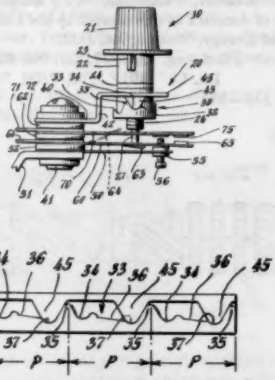
first ends of the blades spaced apart by interposed insulators and the first ends of the blades and the insulators secured together in the sandwich configuration, the conductive spring blades having a pair of juxtaposed switch contacts thereon and adapted for connection in an electrical circuit, and one of the bimetal blade or the flexible spring blade having a stop member for butting against the other to transmit heat responsive motion of the free end of the bimetal blade to the flexible spring blade; and

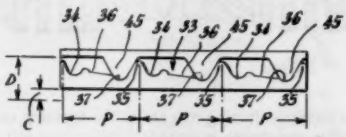
(B) a control mechanism including

(1) a control bracket mounted to the stacked blade assembly and extending generally parallel to and above the upper flexible spring blade when it is in its free position, the control bracket defining an opening therethrough above and intermediate the ends of the stacked blade assembly,

(2) a rotatable control shaft extending through the control bracket opening and also through an opening defined by the upper flexible spring blade, the end of the control shaft bearing against the intermediate stiff spring blade,

(3) a cam mounted to the control shaft for rotatable movement therewith, the cam interposed between the upper





flexible spring blade and the control bracket and having a cam surface facing the control bracket, and

(4) a cam follower depending from the control bracket adjacent the control shaft for engaging the cam surface wherein the intermediate stiff spring blade has a free position extending upwardly toward the control bracket and is deflected from the free position by the control shaft, the stiff spring blade thereby urging the control shaft and the cam mounted thereto upwardly to engage and hold the cam against the cam follower, and the cam surface comprises an on/off transition portion, whereby rotation of the control shaft moves the cam along the cam follower between a positive off position in which the cam follower, cam and control shaft deflect the stiff blade to separate the pair of switch contacts with the flexible spring blade in its free position and a low temperature on position in which the stiff blade is angled upwardly to close the pair of switch contacts, the bimetal blade operating to open the switch contacts when the low temperature is achieved.

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**4,166,995**

## THERMOSTATIC SNAP SWITCH

**Guillermo E. Pecker, Elizabeth, and Douglas J. Slack, Smithfield Plains, both of Australia, assignors to Texas Instruments Incorporated, Dallas, Tex.**

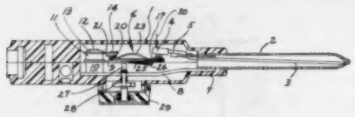
**Filed Nov. 14, 1977, Ser. No. 851,024**

**Int. Cl.[2] H01H *37/46, 37/60***

**U.S. Cl. 337—390** **5 Claims**

1. A thermostatic snap switch comprising a support blade having a movable end, a temperature sensitive means mounted to deflect the movable end of the support blade in response to temperature change, a switch blade which has one end secured to the movable end of the support blade for movement with the movable end of the support blade, the switch blade having a

movable contact at its opposite end movable between positions in and out of engaged relation with a fixed contact, the switch blade having a tension member portion intermediate the ends of the switch blade, and adjustable reaction point means engaging the tensioning member portion on the switch blade at one side of the plane of the switch blade for holding the movable contact in one of said contact positions, the reaction point



means being adjustable in position through the plane of the switch blade to the opposite side of the plane of the switch blade to overbalance the switch blade and move the movable contact to the other of said contact positions with snap action, whereby the reaction point means is adapted to be located so that deflecting of the movable end of the support blade in response to selected temperature change moves the movable contact between said contact positions with snap action.

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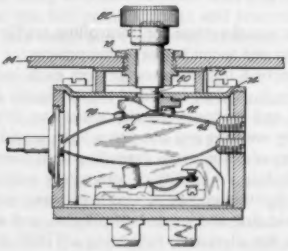
**4,166,996**

## THERMOSTATIC CONTROL DEVICE

**Alan A. Matthies, Milwaukee, Wis., assignor to The Singer Company, New York, N.Y.**

**Filed Dec. 29, 1977, Ser. No. 865,540**
**Int. Cl.[2] H01H *37/46, 37/74***
**U.S. Cl. 337—386** **11 Claims**



1. A thermostatic control comprising a housing,
temperature responsive heat motor means mounted in a wall of the housing and including a movable member,
an abutment fixed in a wall of the housing opposed to the wall in which the motor means is mounted,
a flat spring member mounted in the housing between the movable member and said abutment and having a length greater than the distance between the movable member and the abutment whereby the spring member is initially bowed and the bow of the spring changes with movement of the movable member, an
a control device actuated by the spring member as it flexes, the coefficient of expansion of the spring member and the housing being substantially the same whereby the control is temperature compensated.

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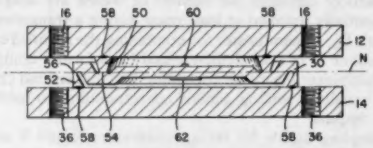
**4,166,997**

## LOAD DISC

**Walter P. Kistler, Redmond, Wash., assignor to Kistler-Morse Corporation, Bellevue, Wash.**

**Filed Apr. 27, 1978, Ser. No. 900,521**
**Int. Cl.[2] G01L *1/22***
**U.S. Cl. 338—5** **9 Claims**

1. A load disc, comprising:
first and second mounting plates each having means for securing said plates to respective structural members;
first and second annular support rings of unequal diameter projecting from said first and second mounting plates, respectively; and
a generally cylindrical flex plate having strain sensing means secured thereto for providing an electrical indication of the strain sensed by said strain sensing means; said flex plate having formed therein first and second annular re-



cesses on opposite faces of said flex plate having diameters corresponding to the diameters of said first and second annular support rings, respectively, the ends of said first and second support rings being secured to said flex plate within said first and second recesses, respectively, with the line of attachment between said support rings and said flex plate being positioned near the neutral plane of said flex plate thereby minimizing radial forces on said support rings responsive to deformation of said flex plate.

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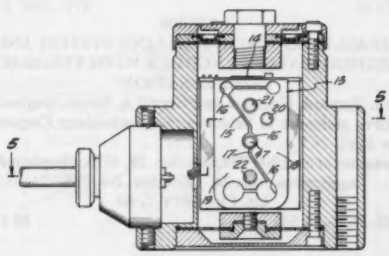
**4,166,998**

## FORCE TRANSDUCER

**Walter H. Eisele, Malibu, Calif., assignor to Gould Inc., Statham Instrument Division, Oxnard, Calif.**

**Filed Jun. 22, 1977, Ser. No. 808,788**
**Int. Cl.[2] G01L *1/22***
**U.S. Cl. 338—5** **9 Claims**



1. A force measuring load cell having a strain gage as the force transducer, comprising:
a platelike body having a pair of major surface areas and a peripheral edge surface, said edge surface having a portion formed into a flat, on which said strain gage is located;
a first elongated slotlike opening passing through both major surfaces of said body and extending closely adjacent to said edge surface flat and forming a beam therebetween;
a second elongated opening passing through both major surfaces of said body and spaced from said first opening;
a diagonal opening passing through both major surfaces of said body and interconnecting opposite ends of said first and second openings;
means interconnected with said body solely on one side of said diagonal opening for supporting said body; and
means interconnected with said body on the other side of said diagonal opening for applying a force to be measured to said body along a direction transverse to said flat and said strain gage.

4,166,999

## HIGH RESOLUTION PHASE SHIFTER BEAMFORMER FOR A CYLINDRICAL ARRAY

Jesse J. Brady, III, Austin, Tex., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 10, 1978, Ser. No. 894,874
Int. Cl.[2] G01S *3/80*
U.S. Cl. 367—105 9 Claims

1. In a sonar system including an array of a number N of transducer elements the outputs of which are adapted to be sequentially scanned at least once during a transmission pulse length $P_L$, a beamformer for combining the scanned outputs of a number M of said elements, said beamformer comprising:

multiplexer means for providing first and second channels of serialized analog signals corresponding to said scanned outputs;

sampling means for taking quadrature X and Y samples of said analog signals in said first and second channels, respectively;

analog to digital means for converting said quadrature X samples to a series of digital X samples in said first channel and a series of digital Y samples in said channel;

storage means for storing M of said digital X samples and for storing M of said digital Y samples;

shading means for applying predetermined shading factors to each of said digital X samples in said storage means and to each of said digital Y samples in said storage means so as to provide M shaded digital X samples and M shaded digital Y samples and for combining thereof to provide alternate outputs of M digital X component values and M digital Y component values;

adder means for preforming predetermined summations of said M digital X component values and of said M digital Y component values to provide a combined digital $X_j$ component value and a combined digital $Y_j$ component value for a resultant beam corresponding to said M elements.

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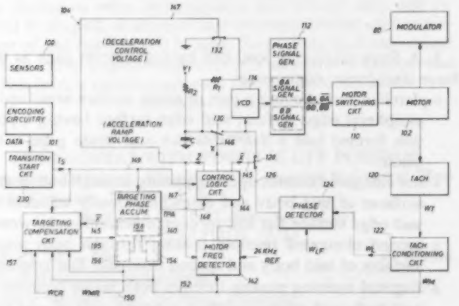
4,167,000

## MEASURING-WHILE DRILLING SYSTEM AND METHOD HAVING ENCODER WITH FEEDBACK COMPENSATION

James I. Bernard, Houston, and Gerald A. Strom, Dayton, both of Tex., assignors to Schlumberger Technology Corporation, New York, N.Y.

Continuation of Ser. No. 727,685, Sep. 29, 1976, abandoned. This application Apr. 24, 1978, Ser. No. 898,721
Int. Cl.[2] G01V *1/40*
U.S. Cl. 367—84 LD 39 Claims




33. In a measuring-while-drilling system for use downhole in a borehole, a method using a modulator for encoding a data signal representative of downhole drilling characteristics comprising the steps of:

(a) controllably operating the modulator to modulate the data signal in a selected manner to thereby generate a modulated data signal having a sequence of encoded data, the sequence of encoded data being defined by a sequence of modulations said selected manner being defined in an attempt to achieve desired modulation characteristics; and

(b) during a given modulation, altering said selected manner of operation in response to a previously occurring modulation, thereby more nearly achieving said desired modulation characteristics.

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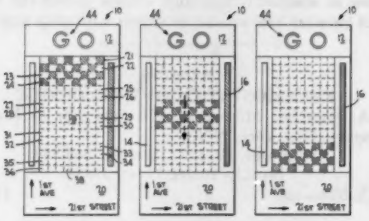
4,167,001

## STEPPING SWITCH CONTROLLED TRAFFIC SIGNAL DEVICES

Ralph W. Gilmore, P.O. Box 426, Brundidge, Ala. 36010

Filed Jul. 15, 1977, Ser. No. 816,170
Int. Cl.[2] G08G *1/00*
U.S. Cl. 340—43 12 Claims




9. A traffic signal system for controlling traffic at an intersection of first and second streets, comprising:

first and second traffic signal devices each including two traffic display fields, each said traffic display field including first and second vertically extending strip lights respectively emitting red and green light, a grid comprising a plurality of horizontally extending light rows, each light row including a plurality of alternately positioned green and red lighting elements, said grid being positioned between said first and second strip lights, and a STOP-GO indicator for alternately indicating a STOP or a GO condition in respective red and green lights;

means for cyclically controlling the lighting of the lighting elements in said traffic display field to indicate respective alternate STOP and GO traffic conditions, said GO condition being indicated by the lighting of said second vertical strip, the GO indicator portion of said STOP-GO indicator and the green lighting elements in a block of adjacent horizontal light rows, whereby the block of energized green lighting elements descends from the top to the bottom of said grid in successive steps having a predetermined delay interval between said steps;

said STOP condition being indicated by the lighting of said first vertical strip, the STOP indicator portion of said STOP-GO indicator and the red lighting elements in a block of adjacent horizontal light rows, whereby the block of energized red lighting elements descends from the top to the bottom of said grid in successive steps, with a predetermined delay interval between said steps;

the respective traffic display fields of each of said first and second traffic signal devices being connected in parallel and each facing in opposite directions along the respective first and second streets; and

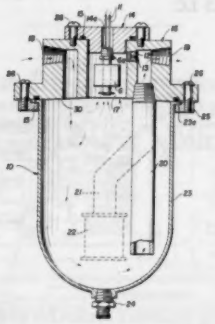
means for cyclically controlling the lighting of the lighting elements in said first and second traffic signal devices for indicating respective alternate STOP and GO traffic conditions.

**4,167,002**

## LOW FUEL INDICATING DEVICE

**Newman C. Foley, Superior, Wis., assignor to N. B. F. Company, Inc., Superior, Wis.**

**Filed Mar. 10, 1978, Ser. No. 885,371**
**Int. Cl.[2] G08B *21/00***
**U.S. Cl. 340—59** **10 Claims**



1. A device for detecting and indicating a low liquid fuel supply for an airplane engine or the like, said device comprising:

a head having an inlet adapted to be connected to the fuel supply, and an outlet adapted to be connected to a fuel line leading to the engine;

a reservoir secured to and disposed beneath said head, said reservoir being in communication with said inlet and said outlet so that fuel passes through said reservoir from said inlet to said outlet and accumulates therein;

said head having a vapor chamber disposed above and in communication with said reservoir, and orifice means disposed between said vapor chamber and said outlet to provide for a predetermined flow of vapor from said vapor chamber to said outlet; and

float switch means movably disposed within said vapor chamber and adapted to be electrically connected to a low fuel indicator, said float switch means being movable between an upper position wherein it opens a circuit to the indicator and a lower position wherein it closes a circuit to the indicator;

whereby when the fuel supply is adequate, fuel entering said inlet and reservoir has a normal vapor content and liquid fuel accumulates in said reservoir and rises to a level to maintain said float switch means in said upper position, the vapor rising above the liquid fuel into said vapor chamber and passing through said orifice to said outlet; and when the fuel supply is low, the fuel entering the reservoir has a high vapor content which accumulates in said vapor chamber and forces the liquid fuel level downwardly so that said float switch means moves to its lower position to indicate low fuel; the liquid fuel in said reservoir providing a temporary fuel supply through said outlet after low fuel is indicated.

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**4,167,003**

## OPERATION AND COMMAND FAILURE MONITOR

**Benny W. Stansbury, 115 Jason, West Monroe, La. 71291**

**Filed Oct. 11, 1977, Ser. No. 840,828**
**Int. Cl.[2] G08B *19/00***
**U.S. Cl. 340—501** **21 Claims**

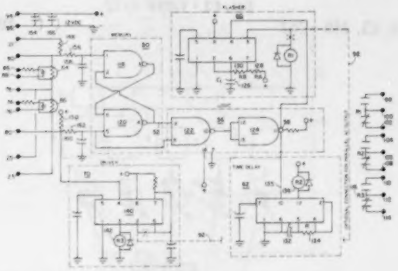
1. A device for monitoring an electrical stoppage or failure in an electrical circuit for a piece of electrical equipment comprising:

(a) an alarm module having at least two inputs and at least three outputs,

(1) the first input being used to receive a run or stop status of the piece of electrical equipment being monitored;

(2) the second input being used to receive a signal indicating that the circuit being monitored has been given a normal stop command;

(3) the first output being designed to transmit a pulsating output signal alternating between a high and a low state;



(4) the second output being designed to transmit a time delayed steady output signal; and

(5) the third output being designed to transmit a steady output which is a repeat or complement of the first input.

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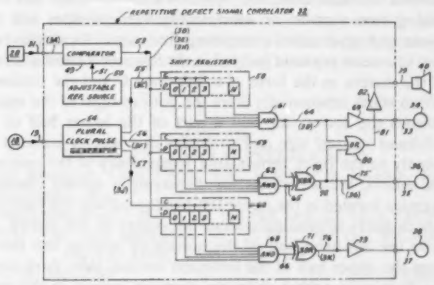
**4,167,004**

## APPARATUS FOR DETECTING PLURAL REPETITIVE SIGNALS

**Arthur J. Schenck, Phillipsburg, N.J., and Richard H. Krause, Coopersburg, Pa., assignors to Bethlehem Steel Corporation, Bethlehem, Pa.**

**Filed Mar. 30, 1978, Ser. No. 892,009**
**Int. Cl.[2] G08B *23/00*; G06F *7/04*; H03K *21/36***
**U.S. Cl. 340—679** **11 Claims**




1. Apparatus for selectively detecting variable repetitive input signals according to one of plural repetitive rates, comprising:

(a) means for producing a pulse train of essentially repetitive input signals which exceed a predetermined amplitude above a noise level,

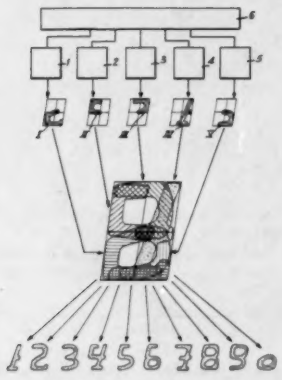
(b) means including clock means responsive to an external clock source for generating plural clock pulses each related to one of the plural repetitive rates, and further including plural storage circuits having parallel-connected data inputs, each storage circuit sequentially and temporarily storing a predetermined number of said train pulses in response to a different one of said clock pulses, each storage circuit having plural element outputs grouped according to one of the repetitive rates, and

(c) means receiving each group of storage circuit outputs for selectively producing one of plural output pulses indicative of a particular one of the plural repetitive rates of the input signal.

## 4,167,005
## DEVICE FOR DISPLAYING FIGURES BY A COMBINATION OF CHARACTER SEGMENTS

Jean-Pierre Beauviala, Grenoble, France, assignor to Societe AATON, Grenoble, France

Filed May 31, 1978, Ser. No. 911,222
Claims priority, application France, Jun. 1, 1977, 77 16682; Jun. 24, 1977, 77 19376
Int. Cl.[2] G09F 9/32
U.S. Cl. 340—762 10 Claims

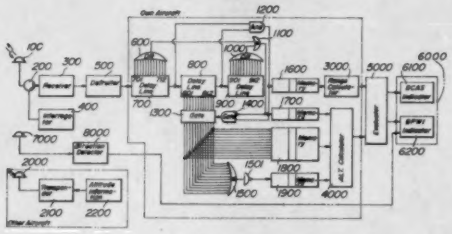


1. A device for displaying figures by combination of elementary character segments, five in number, by showing, simultaneously or successively, at least one of the five elementary character segments, with shapes and positions determined with respect to a matrix in the form of a rectangle or parallelogram divided into four quadrants by its two median lines, and comprising two vertical or substantially vertical sides and two lower and upper sides, comprising first means for displaying a first character segment located in the lower left-hand quadrant of the matrix, in the form of a deformed C and the outline of which starts substantially from the bottom right of the matrix, follows the lower side and a part of the lower half of the left-hand vertical side and continues in a section inclined upwardly to the right, terminating substantially at the centre of the matrix; second means for displaying a second character segment located in the upper left-hand quadrant, the outline of which starts substantially from the centre of the matrix, follows the left-hand half of the horizontal median line then at least the upper half of the left-hand vertical side; third means for displaying a third character segment located in the upper right-hand quadrant, substantially in the form of an inversed C and the outline of which starts from the centre of the matrix, follows the right-hand half of the horizontal median line, then the upper half of the right-hand vertical side and terminates in a section along the right-hand half and part of the left-hand half of the upper side of the matrix; fourth means for displaying a fourth character segment of which the outline comprises a first horizontal section extending over a part of the lower side of the matrix, at the centre thereof, and a second rectilinear section starting from the centre of the first section and extending vertically or substantially vertically to a point in the right-hand half of the upper side, and fifth means for displaying a fifth character segment located in the bottom right quadrant, substantially in the form of an inversed C and the outline of which starts substantially from the centre of the matrix, follows the right-hand half of the horizontal median line, then the lower half of the right-hand vertical side and terminates in a section along the right-hand half and part of the left-hand half of the lower side of the matrix.

## 4,167,006
## COLLISION AVOIDANCE SYSTEM OF AIRCRAFT

Chuhei Funatsu, Yokohama, and Toshikiyo Hirata, Samukawa, both of Japan, assignors to Toyo Tsushinki Kabushiki Kaisha, Kawasaki, Japan

Filed Oct. 19, 1977, Ser. No. 843,657
Claims priority, application Japan, Oct. 22, 1976, 51-127471
Int. Cl.[2] G01S 9/56
U.S. Cl. 343—6.5 LC 6 Claims

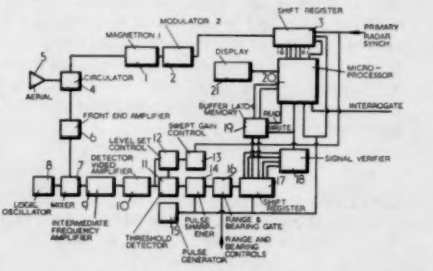


4. In a collision avoidance system for aircraft equipped with transponders which transmit response signals to interrogations from interrogating aircraft, means within the interrogating aircraft operative on receipt from an interrogated aircraft of said response signals for indicating to the interrogating aircraft pilot, as a beacon based collision avoidance indication, a direction to navigate to avoid collision, and means within the interrogating aircraft operative on receipt from a plurality of transponders in interrogated aircraft of response signals having framing pulses, within which the respective response signals are superposed, for automatically switching from said beacon based collision avoidance indication to a beacon based proximity warning indication for indicating one or more of (a) the distance between the interrogating and the interrogated aircraft, (b) the approaching speed of the aircraft, (c) time to collision or (d) relative flying direction.

## 4,167,007
## METHOD AND APPARATUS FOR IDENTIFYING RADAR TARGETS

Ian L. M. McGeoch, Southerns, Castle Hedingham, Halstead, Essex, and William B. Stawell, The Warren, Chalfont Rd., Beaconsfield, Buckinghamshire, both of England

Filed Jun. 29, 1977, Ser. No. 811,428
Claims priority, application United Kingdom, Jun. 30, 1976, 27172/76
Int. Cl.[2] G01S 9/56
U.S. Cl. 343—6.5 LC 28 Claims



22. An interrogation apparatus for generating first and second modulated interrogation signals differing from one another by the modulation component of a common carrier, transmitting means for transmitting the first and second inter-

rogation signals; receiving means capable of receiving first and second modulated identification signals from a target, each of which identification signals comprise a common carrier modulated by signals containing data concerning the identity of the target, means for demodulating the received signals; and means for generating, upon receipt and demodulation of the first and second identification signals, a third signal containing cumulative data concerning the target.

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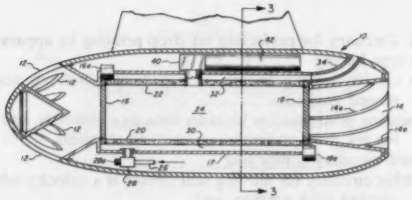
**4,167,008**

## FLUID BED CHAFF DISPENSER

**John E. Blickenstaff, North Tonawanda, N.Y., assignor to Calspan Corporation, Buffalo, N.Y.**

**Filed Sep. 23, 1976, Ser. No. 726,037**
**Int. Cl.[2] H04K *3/00***
**U.S. Cl. 343—18 E** **4 Claims**



1. A fluid bed chaff dispenser including:

I. fluidization chamber means;

II. means for supplying chaff fibers and fluidization media to said fluidization chamber means;

III. first flow path means including first and second porous means for supplying air to said fluidization chamber means through said first porous means which defines the bottom portion of said fluidization chamber means to cause the churning and separation of any chaff fibers present therein before passing outwardly through said second porous means; and

IV. second flow path means including normally closed valve means for supplying air to said fluidization chamber means and for sweeping all of the separated chaff fibers therefrom when said valve means are opened.

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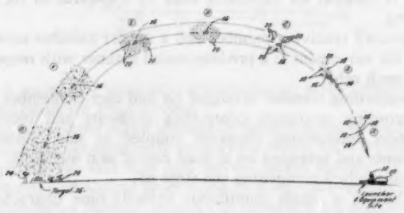
**4,167,009**

## RE-ENTRY CHAFF

**Walter Schwartz, Northridge, Calif., assignor to McDonnell Douglas Corporation, Long Beach, Calif.**

**Filed Aug. 8, 1963, Ser. No. 301,236**
**Int. Cl.[2] G01S *7/38;* F42B *15/24***
**U.S. Cl. 343—18 B** **6 Claims**



4. A radar disabling means, including:

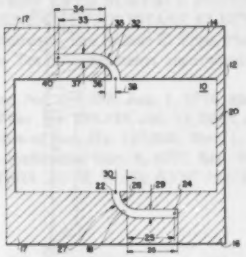
a plurality of individual pieces of radar reflective chaff, each having a tear-drop shape.

**4,167,010**

## TERMINATED MICROSTRIP ANTENNA

**John L. Kerr, Monmouth County, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Mar. 13, 1978, Ser. No. 885,727**
**Int. Cl.[2] H01Q *1/38***
**U.S. Cl. 343—700 MS** **8 Claims**



1. Microstrip antenna apparatus comprising:

a circuit board of dielectric material having front and back sides with a metallic ground plane on the back side thereof;

a radiating element in the form of a patch of metal etched on the front side of said board;

first transmission line means connected along a center line of said radiating element to a first point at one side of the center thereof for coupling to radio equipment;

second transmission line means connected along said center line of the radiating element to a second point at the opposite side of the center, terminated in an impedance very substantially different from the characteristic impedance so that the radiating element is tunable to resonant frequencies depending on the length of the second transmission line means and the value of said impedance, whereby the radiating element may be caused to resonate for a plurality of separate frequencies with the first transmission line means having a low standing wave ratio.

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**4,167,011**

## RADIO ANTENNA CONSTRUCTION

**John Altmayer, Cape Coral, Fla., assignor to Hustler, Inc., Kissimmee, Fla.**

**Continuation-in-part of Ser. No. 753,318, Dec. 22, 1976, Pat. No. 4,117,493. This application Nov. 7, 1977, Ser. No. 849,180**
**Int. Cl.[2] H01Q *9/00, 1/00;* H01F *27/30***
**U.S. Cl. 343—749** **6 Claims**

1. In a radio antenna including:

(a) an elongated generally rigid radiating element;

(b) a first multi-turn winding positioned at one end of said element and having a pair of terminals, one being connected to the adjacent end of said element;

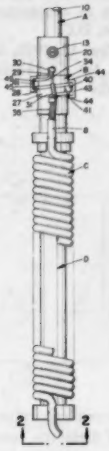
(c) a second winding closely surrounding said first winding and having at least two axially spaced turns and a pair of terminals;

(d) a coaxial cable having an inner conductor and an outer shield conductor each connected to the respective terminals of said second winding said outer shield conductor also connected to one of said terminals of said first multi-turn winding; the improvement which comprises:

(e) an insulating member in the shape of a split ring with the ends axially offset positioned between said second winding spaced turns;

(f) a plurality of circumferentially narrow axially extending clamping members having hooks at the ends, said clamping members being positioned over the outside of said

second winding spaced turns and said split ring, the hooks engaging the outwardly facing sides of said second wind-



ing spaced turns and pressing the opposite sides against the sides of said split ring.

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**4,167,012**

## CHART-RECORDING

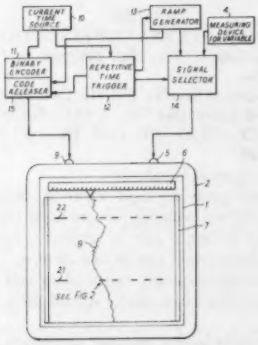
**Raymond M. deVial, Beckenham, and Philip Cowlin, Sevenoaks, both of England, assignors to Babcock Controls Limited, Croydon, England**

**Filed Feb. 7, 1978, Ser. No. 875,870**

**Claims priority, application United Kingdom, Feb. 9, 1977, 5310/77**

**Int. Cl.[2] G01D *9/34***

**U.S. Cl. 346—62** **7 Claims**




1. A recording system comprising:

a chart recorder, having a movable pen arranged for providing a record on a moving chart of the varying values of a first variable;

means for causing the pen repetitively, at intervals or at predetermined times to execute a traverse on the chart to record in binary representation the current value of a second variable on the chart by marking or not marking chart zones crossed in the traverse and allotted to respective information bits for the value of the second variable.

**4,167,013**

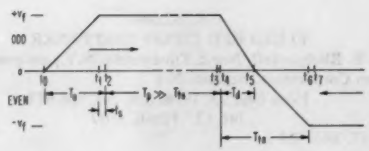
## CIRCUITRY FOR PERFECTING INK DROP PRINTING AT NONLINEAR CARRIER VELOCITY

**Phillip K. Hoskins, and Harmon W. Johnson, both of San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Feb. 25, 1977, Ser. No. 772,196**

**Int. Cl.[2] G01D *15/18***

**U.S. Cl. 346—75** **18 Claims**




1. Circuitry for perfecting ink drop printing by apparatus of the type having

a carrier bearing an ink drop projector moving across a record medium,

bearing print position location detecting elements, and bearing ink drop projection controlling elements,

said circuitry comprising

drive circuitry for moving said carrier at a velocity which is varying with position, and

circuitry for calculating the lead time for a print enabling signal and the actual velocity of the carrier,

whereby said record member is marked at a predetermined designated position.

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**4,167,014**

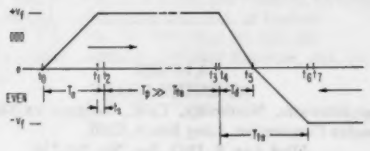
## CIRCUITRY FOR PERFECTING INK DROP PRINTING AT VARYING CARRIER VELOCITY

**Richard H. Darling, Monte Sereno, and Francis J. Perry, Morgan Hill, both of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Feb. 25, 1977, Ser. No. 772,197**

**Int. Cl.[2] G01D *15/18, 9/00***

**U.S. Cl. 346—75** **4 Claims**




1. A method for recording data by apparatus of the type having

a record receiving member and a carrier member arranged for movement in a predetermined manner with respect to each other,

a recording member arranged on said carrier member, and recording operation controlling elements and recording position determining elements coupled to said controlling elements and arranged on at least one of said members,

said method comprising the steps of

selecting a single continuous velocity-time characteristic profile for moving said carrier member, and moving said carrier member with respect to said record receiving member at a velocity varying with the relative position of said carrier member with respect to said record receiving member,

sensing the instantaneous positions of said carrier member

with respect to predetermined record element receiving positions on said record receiving member,
sensing the instantaneous velocity of said carrier member,
calculating the lead times on the basis of the instantaneous position and instantaneous velocity of said carrier member for generating a record enabling signal, and
enabling said recording operation controlling elements according to the result of the lead time calculations for recording said data on said record receiving member at predetermined designated positions.

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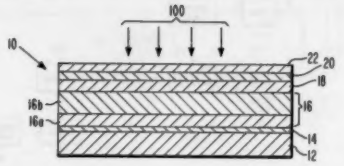
## 4,167,015
## CERMET LAYER FOR AMORPHOUS SILICON SOLAR CELLS

**Joseph J. Hanak, Lawrenceville, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed Apr. 24, 1978, Ser. No. 899,242**
**Int. Cl.[2] H01L** *29/161*
**U.S. Cl. 357—16** **16 Claims**




1. In an amorphous silicon solar cell which comprises a body of hydrogenated amorphous silicon with a means for ohmically contacting said body of hydrogenated amorphous silicon incident to solar radiation and a metal layer ohmically contacting said body of hydrogenated amorphous silicon opposite to said incident surface, the improvement which comprises:
a transparent high work function metal cermet layer disposed between and contacting said means for forming an ohmic contact and said body of hydrogenated amorphous silicon.

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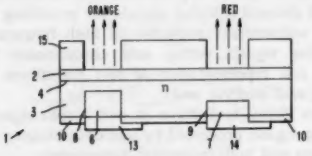
## 4,167,016
## OPTICALLY ISOLATED MONOLITHIC LIGHT EMITTING DIODE ARRAY

**Roland Y. Hung, and Kwang K. Shih, both of Yorktown Heights, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Sep. 21, 1977, Ser. No. 835,098**
**Int. Cl.[2] H01L** *33/00*
**U.S. Cl. 357—17** **3 Claims**




1. A multicolor integrated semiconductor array comprising:
a semiconductor body having
first and second major essentially parallel surfaces with first and second epitaxially contiguous layers each essentially parallel to said first and second major surfaces of said body, said second layer being of $AB_{1-x}C_x$ type of semiconductor material having the variable x varying along a direction perpendicular to said second major surface of said body,
a layer of oxide over said second semiconductor layer at said second major surface of said body,
at least one p-n junction for each color positioned in said second layer at a value of the variable x along said perpendicular direction corresponding to a particular color,
an electrical connection for each said p-n junction extending through said oxide layer and
an optical isolation opening in said first layer aligned with each said p-n junction.

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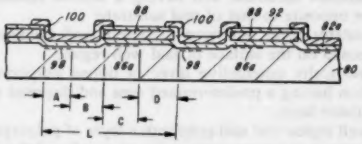
## 4,167,017
## CCD STRUCTURES WITH SURFACE POTENTIAL ASYMMETRY BENEATH THE PHASE ELECTRODES

**Al F. Tasch, Jr., Richardson, and Robert C. Frye, Plano, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Continuation of Ser. No. 691,655, Jun. 1, 1976, abandoned, which is a division of Ser. No. 598,316, Jul. 23, 1975, abandoned, which is a continuation of Ser. No. 737,648, Nov. 1, 1976, Pat. No. 4,035,906. This application Nov. 4, 1977, Ser. No. 853,380**
**Int. Cl.[2] H01L** *29/78, 29/04;* **G11C** *19/28*
**U.S. Cl. 357—24** **4 Claims**



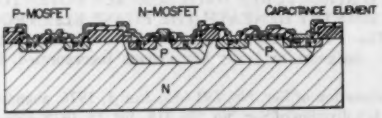

1. A charge coupled device comprising:
a substrate of semiconductor material of one conductivity type, said substrate having a first surface;
means defining a charge transfer channel in said substrate near said first surface;
said channel-defining means including a body of insulating material disposed on said first surface of said substrate;
a first plurality of spaced apart phase electrodes of uniform thickness overlying said channel and embedded in said body of insulating material so as to provide a layer of insulating material between each of said first plurality of phase electrodes and said substrate;
a second plurality of spaced apart phase electrodes of uniform thickness disposed on said body of insulating material in alternating sequence with said first plurality of spaced apart phase electrodes, each of said second plurality of phase electrodes being positioned on the body of insulating material in the space between successive ones of said first plurality of phase electrodes in marginally overlapping relationship with respect thereto so as to provide a layer of insulating material between adjacent ones of said phase electrodes of said first and second pluralities of phase electrodes and a layer of insulating material between each of said second plurality of phase electrodes and said substrate;
the insulation layer disposed between each of said electrodes of said first and second pluralities of phase electrodes and said substrate being of substantially uniform thickness; and
respective regions of dopant ions provided under a selected portion only of each electrode of said first and second pluralities of phase electrodes, said regions of dopant ions being of said one conductivity type and having a dopant concentration that is greater than the dopant concentration of said one conductivity type material of said semiconductor substrate, said regions of dopant ions being disposed in the portions of said semiconductor substrate lying beneath said insulation layer of substantially uniform thickness, and each of said regions of dopant ions being respectively aligned with one edge of the electrode corresponding thereto and extending along said channel but terminating short of the opposite edge of the electrode corresponding thereto to impart surface potential asymmetry at the electrode location.

**4,167,018**

## MIS CAPACITANCE ELEMENT

**Kenichi Ohba, Kokubunji, and Kazutaka Narita, Kodaira, both of Japan, assignors to Hitachi, Ltd., Japan**

**Filed Feb. 23, 1977, Ser. No. 771,246**
**Claims priority, application Japan, Feb. 25, 1976, 51-18961**
**Int. Cl.[2] H01L *27/04***
**U.S. Cl. 357—51** **25 Claims**




1. A capacitance element formed in a complementary metal-insulator-semiconductor (MIS) device comprising:
- a semiconductor substrate of a first conductivity type;
- a well region formed in one principal surface of said semiconductor substrate, and having a second conductivity type opposite to that of said substrate;
- an insulator layer having a predetermined thickness and disposed on the surface of said well region;
- an electrically conductive layer of doped polycrystalline silicon having a predetermined area and disposed on said insulator layer;
- said well region and said conductive layer of polycrystalline silicon serving as opposite polar electrodes of the capacitance element;
- a dc voltage being applied between said electrodes with such polarity to prevent generation of an inversion layer in the surface of said well region; and
- means for electrically connecting said well region to said semiconductor substrate.

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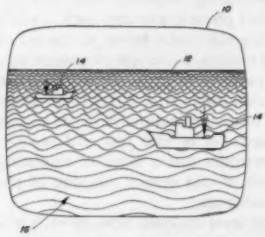
**4,167,019**

## VIDEO IMAGE GENERATOR

**David M. Shepperd, Santa Clara, Calif., assignor to Atari, Inc., Sunnyvale, Calif.**

**Filed Jan. 5, 1978, Ser. No. 867,276**
**Int. Cl.[2] H04N *5/22***
**U.S. Cl. 358—22** **9 Claims**




1. Apparatus for producing a video background image formed of a plurality of raster-oriented horizontal lines in successive scan frames with apparent motion provided in response to motion control signals comprising:
- pattern generator means for providing a plurality of background patterns which are produced sequentially frame by frame to provide a visual appearance of forward movement, said pattern generator means including a line pattern memory for storing at addressable locations line patterns for producing said horizontal lines to form said background patterns, and a pattern sequence memory coupled to said line pattern memory for storing a plurality of pattern sequences which select said line patterns in said line pattern memory to produce said background patterns, each said pattern sequence providing a line pattern address for each said horizontal line of said background image, and vertical control means coupled to said pattern sequence memory and responsive to said motion control signals for selecting a one of said stored plurality of pattern sequences and for controlling the rate of selection of said stored pattern sequences whereby said background patterns are produced sequentially to change the rate of apparent forward movement.

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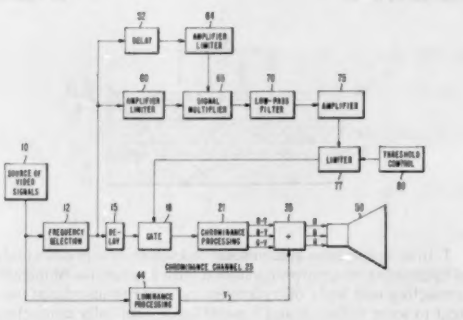
**4,167,020**

## SUPPRESSION OF LUMINANCE SIGNAL CONTAMINATION OF CHROMINANCE SIGNALS IN A VIDEO SIGNAL PROCESSING SYSTEM

**David D. Holmes, Trenton, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed Dec. 12, 1977, Ser. No. 859,863**
**Int. Cl.[2] H04N *9/535***
**U.S. Cl. 358—36** **11 Claims**




1. In a video signal processing system including means for reproducing a color image in response to image representative luminance and chrominance components of successive image line intervals of said video signal, said luminance component being susceptible of rapid amplitude transitions including high frequency components within the range of chrominance frequencies and occurring within said line intervals, said system also including a chrominance channel for processing said chrominance component, apparatus comprising:
- means for selectively coupling video signals within said chrominance frequency range to said chrominace channel;
- means for delaying said selected signals a predetermined amount significantly less than said line interval and less than an interval during which said transitions can occur in significant part;
- signal detector means responsive to said selected signals and to said delayed selected signals for providing an output signal substantially exclusive of high frequency signals including signals within said chrominance frequency range and representative of said transitions occurring during said interval; and
- utilization means responsive to said output signal for controlling signals processed by said chrominance channel to suppress said high frequency components.

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**4,167,021**

## SUPPRESSION OF CHROMINANCE SIGNAL CONTAMINATION OF THE LUMINANCE SIGNAL IN A VIDEO SIGNAL PROCESSING SYSTEM

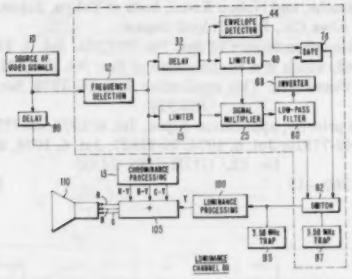
**David D. Holmes, Trenton, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed Dec. 12, 1977, Ser. No. 859,922**
**Int. Cl.[2] H04N *9/535***
**U.S. Cl. 358—36** **16 Claims**

1. In a color television signal processing system for controlling the luminance and chrominance of a reproduced color

image in response to image representative luminance and chrominance components of successive image line intervals of said color television signal, wherein said chrominance component comprises modulated color subcarrier waves exhibiting a parameter subject to transitions occurring within said line intervals, with rapid ones of said transitions being associated with the presence of subcarrier sideband components which may effect an undesirable disturbance of said reproduced color image if permitted to significantly affect the luminance thereof; apparatus comprising:

frequency selective means responsive to said color television signal for passing signal frequencies of said chrominance component;




means for delaying signals passed by said frequency selective means a predetermined amount significantly less than said line interval;

detector means responsive to the input of said signal delaying means and to the output of said signal delaying means for providing an output signal substantially exclusive of said chrominance component and indicative of the occurrence of one of said rapid parameter transitions; and

utilization means responsive to said output signal for preventing said associated subcarrier sideband components from significantly affecting the luminance of said reproduced color image.

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**4,167,022**

## SETUP CONTROL UNIT FOR TELEVISION CAMERAS

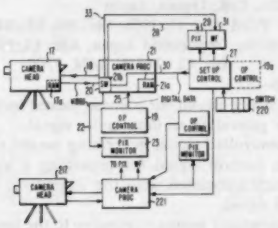
**Robert A. Dischert, Burlington, and Laurence J. Thorpe, Marlton, both of N.J., assignors to RCA Corporation, New York, N.Y.**

**Filed Apr. 6, 1978, Ser. No. 894,010**

**Claims priority, application United Kingdom, May 25, 1977, 22810/77**

**Int. Cl.² H04N *5/24, 9/04***

**U.S. Cl. 358—41** **10 Claims**




1. In a color television camera system of the type having a digital memory for storing the separate setup control signals for the camera at separate address locations and means coupled to said memory for providing said control signals to appropriate camera control circuitry for setting up said camera, and a monitor coupled via a video switcher to the video signals from said camera, a setup control unit adapted to be coupled to said memory and said video switcher and in viewable distance from said monitor for changing the control values stored in the memory comprising:

a manually adjustable control;

means responsive to the manual movement of said adjustable control for providing binary correction signals corresponding to the manual movement thereof;

manual switch means for manually selecting the setup control signal to be modified;

means responsive to the manually selected position of said switch means for generating a digital memory address corresponding to the memory address of the setup control signal selected to be modified by said adjustable control; and

means responsive to the selected position of the switch means for generating appropriate switch control signals for the video switcher to display on the monitor the function being adjusted.

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**4,167,023**

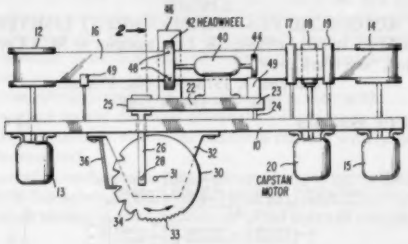
## ROTATING HEAD RECORDER WITH DIFFERENT RECORDING AND PLAYBACK SPEEDS

**Oliver E. Bessette, Stratford, and James S. Griffin, Burlington, both of N.J., assignors to RCA Corporation, New York, N.Y.**

**Continuation of Ser. No. 694,377, Jun. 9, 1976, abandoned. This application Nov. 17, 1977, Ser. No. 852,448**

**Int. Cl.² H04N *5/76***

**U.S. Cl. 358—127** **3 Claims**




3. A recording and reproducing system capable of recording data at any data rate within a continuous range including N 2-to-1 sub ranges, and playback at any data rate within the same continuous range,

linear drive means to drive an elongated recording medium in a linear direction,

transverse drive means to drive heads on a rotating headwheel over the recording medium in a transverse direction,

means to adjust the plane of rotation of said headwheel to N progressively slightly different predetermined transverse tilt angles corresponding respectively with said N sub ranges, so that each head always follows a path across said medium having the same angle $\theta$ with the direction of linear motion of the medium, and

speed control means responsive to a speed control signal for any selected data rate within the continuous range to operate said linear drive means at a corresponding speed, and to operate said transverse drive means at a speed having a ratio NK with said linear speed, where K is a constant and N is the sub range of the selected data rate.

**4,167,024**

## SYSTEM FOR RECORDING OR REPRODUCTION OF SIGNALS BY MEANS OF POLARIZED LIGHT BEAMS

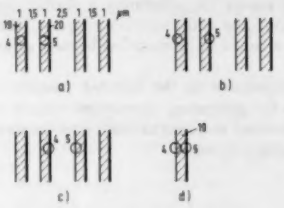
**Hansjoachim Hamisch, Berlin, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Jul. 29, 1977, Ser. No. 820,395**

**Claims priority, application Fed. Rep. of Germany, Jul. 30, 1976, 2634243**

**Int. Cl.[2] G11B** *7/20, 21/10*

**U.S. Cl. 358—128** **18 Claims**



**12**. In an information-transforming method for converting between information in the form of signals and information recorded on a recording medium, the steps of splitting a beam of light emitted by a light source into two component light beams each having a different respective polarization plane, and projecting the differently polarized component light beams side by side onto respective adjoining portions of a recording medium, further including the step of effecting relative movement between the recording medium and the two differently polarized component light beams to produce upon the recording medium a plurality of adjoining pairs of adjoining tracks of recorded information, with the distance between adjoining pairs of tracks being different from the distance between the two tracks of each pair of tracks.

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**4,167,025**

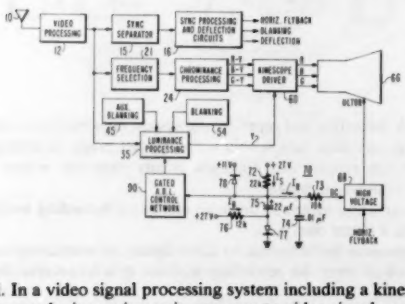
## AUTOMATIC PEAK BEAM CURRENT LIMITER

**Donald H. Willis, Indianapolis, Ind., assignor to RCA Corporation, New York, N.Y.**

**Filed Feb. 9, 1978, Ser. No. 876,238**

**Int. Cl.[2] H04N** *5/68*

**U.S. Cl. 358—243** **14 Claims**




**1**. In a video signal processing system including a kinescope for reproducing an image in response to video signals, apparatus for limiting excessive kinescope current conduction comprising:

means for deriving a control signal indicative of variations in the magnitude of kinescope current above a selected threshold level; and

means for utilizing said control signal to limit kinescope current in accordance with the magnitude of said control signal; and wherein

said control signal deriving means includes filter means subject to alternative operation in a first state and a second state; said filter means, when in said first state, exhibiting a restricted pass band such that said control signal is indicative of only relatively long term variations in the magnitude of said kinescope current; said filter means, when in said second state, exhibiting a pass band significantly wider than said restricted pass band such that said control signal additionally follows relatively short term variations in said kinetic current; and said filter means being subject to switching from said first state to said second state when said kinescope current exceeds a predetermined level.

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**4,167,026**

## INFORMATION REPRODUCING AND RECORDING APPARATUS FOR RECORDING ON TAPE FROM A PHONOGRAPH RECORD

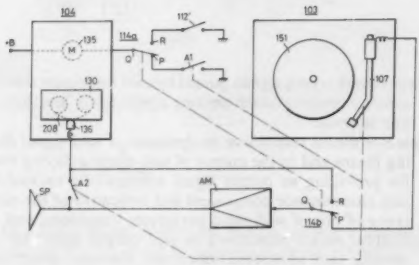
**Yusuke Sambe, and Nobuo Kanoi, both of Tokyo, Japan, assignors to Aiwa Co., Ltd., Tokyo, Japan**

**Continuation-in-part of Ser. No. 797,376, Jul. 7, 1975, abandoned, which is a continuation of Ser. No. 593,441, Jul. 7, 1975, abandoned. This application Jan. 16, 1978, Ser. No. 869,914**

**Claims priority, application Japan, Jul. 6, 1974, 49-77525; Jul. 6, 1974, 49-77526; Jul. 6, 1974, 49-77527; Jul. 6, 1974, 49-77528**

**Int. Cl.[2] G11B** *5/86, 11/00*

**U.S. Cl. 360—15** **2 Claims**




**1**. A combined phonograph record player and magnetic tape recorder for recording on a tape the content of a phonograph record in which the phonograph record player includes a switch which is closed by a starting action of the phonograph record player before playing of the record is started for playing the content thereof and the magnetic tape recorder includes a motor for driving it, the motor being connected to a power source through the switch.

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**4,167,027**

## STABILIZING CIRCUIT FOR PHASE LOCKED LOOP

**Hiroyoshi Hashimoto, Neyagawa, Japan, assignor to Sanyo Electric Co., Ltd., Osaka, Japan**

**Filed Apr. 14, 1978, Ser. No. 896,613**

**Claims priority, application Japan, Apr. 14, 1977, 52/43905**

**Int. Cl.[2] H04N** *5/04, 7/00*

**U.S. Cl. 360—37** **14 Claims**

**1**. A stabilizing circuit for a phase locked loop, comprising:

means for providing an input pulse signal,

voltage controlled signal generating means responsive to a voltage control signal for providing a signal having a frequency associated with the magnitude of the voltage control signal,

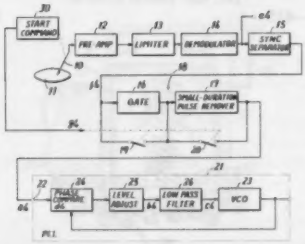
phase comparator means responsive to the input pulse signal and the output signal from said voltage controlled signal generating means for comparing the phase of the input pulse signal with the phase of output signal of said voltage controlled signal generating means, and

low pass filter means for filtering the output signal of said phase comparator means for providing a voltage control signal to said voltage controlled signal generating means, said stabilizing circuit comprising

pseudo input pulse signal generating means for providing to

said phase comparator means with a psuedo input pulse signal having a frequency sufficiently high with respect to the frequency of the input to said phase comparator means from said voltage controlled signal generating means,

switching means operatively coupled to said input pulse signal providing means and said pseudo input pulse signal generating means for preliminarily applying said pseudo input pulse signal to said phase comparator means for bringing the input level of said voltage controlled signal generating means to a given level without the phase being locked by said phase locked loop and associated with receipt of the input pulse signal from said input pulse




signal providing means for selectively applying said input pulse signal to said phase comparator means for achieving a phase locked state by said phase locked loop, and

adjusting means operatively coupled to said low pass filter means for adjusting the input level of said voltage controlled signal generating means when the pseudo input pulse signal is received by said phase comparator means to an input level attained by said voltage controlled signal generating means when the input pulse signal is received by said phase comparator means, whereby said phase locked loop is stabilized in a shorter time period after the input pulse signal is received.

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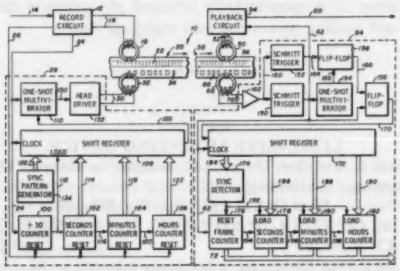
**4,167,028**

## METHOD AND AN APPARATUS FOR TIME SIGNAL ENCODING/DECODING

**Richard Tobey, Sunnyvale, Calif., assignor to Recortec, Inc., Sunnyvale, Calif.**

**Filed Apr. 13, 1978, Ser. No. 896,096**
**Int. Cl.[2] G11B** *5/09, 27/00*
**U.S. Cl. 360—72.2** **16 Claims**




15. A method of recording a video signal and a signal indicative to the elapsed record time onto a video tape which comprises:

developing a series of frame-reference pulses from the video signal;

developing a signal indicative of the elapsed record time, said elapsed record time signal including a plurality of parallel generated bit signals;

multiplexing the parallel generated bit signals at a rate in time synchronization with said frame-reference pulses to develop a serial series of bit signals;

modulating each pulse of said frame-reference pulses with a corresponding bit signal of said serial series of bit signals to develop a modulated signal; and

simultaneously recording said video signal and said modulated signal onto the tape, wherein said modulated signal is recorded onto a single track of the tape.

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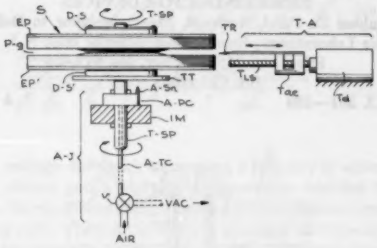
**4,167,029**

## JET DISTRIBUTOR FOR END-WISE PNEUMATIC PARTITIONING OF DISK PACK

**Herbert U. Ragle, Thousand Oaks, and Dean DeMoss, Camarillo, both of Calif., assignors to Burroughs Corporation, Detroit, Mich.**

**Continuation-in-part of Ser. No. 711,647, Aug. 4, 1976, Pat. No. 4,086,640, and Ser. No. 864,011, Dec. 23, 1977, abandoned. This application Mar. 27, 1978, Ser. No. 890,799**
**Int. Cl.[2] G11B** *5/016, 5/82, 25/04*
**U.S. Cl. 360—99** **46 Claims**




1. An improved pneumatic partitioning arrangement adapted to partition a flexible disk pack, end-wise, this pack being characterized by an array of partition-bores extending axially through the pack cross-section, each bore terminating at a different inter-disk gap for conducting separating air thereto;

this arrangement comprising, in combination therewith:

bore-select means disposed externally of said pack in relatively stationary, rotational stabilized relation with respect thereto; and

pneumatic conduction means arranged in operative relation with this select means, and adapted to couple a partitioning air stream to any selected one of the bores in said pack.

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**4,167,030**

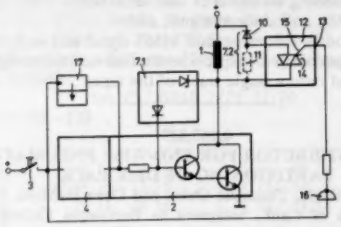
## PROTECTIVE CIRCUIT FOR AN ELECTRONIC SWITCHING AMPLIFIER IN SERIES WITH AN ELECTROMAGNET

**Alfred Heidt, Schwetzingen, Fed. Rep. of Germany, assignor to Frankl & Kirchner GmbH & Co. KG, Schwetzingen, Fed. Rep. of Germany**

**Filed Jul. 14, 1978, Ser. No. 924,902**
**Claims priority, application Fed. Rep. of Germany, Jul. 19, 1977, 2732512**
**Int. Cl.[2] H01H** *47/32*
**U.S. Cl. 361—154** **3 Claims**

1. In a protective circuit for an electronic switching amplifier controllable through an operating switch, the amplifier turning on an electromagnet by supplying current to its winding during an operating interval with timed pulses, a cutoff voltage limiting circuit being connected on one side between the electromagnet and the switching amplifier, the improvement comprising a free-running diode connected in parallel with said winding of said electromagnet via an electronic switch as an additional cutoff voltage limiting circuit, said electronic switch being coupled to said switching amplifier and responsive to an output therefrom during the operating inter-

val, at least during decay of the timing pulses, said electronic switch being blocked when the operating interval is terminated



by said operating switch, and said cutoff voltage limiting circuit being conductive when said electronic switch is blocked.

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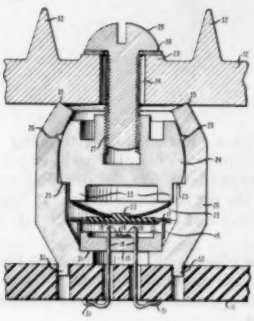
**4,167,031**

## HEAT DISSIPATING ASSEMBLY FOR SEMICONDUCTOR DEVICES

**Parbhubhai D. Patel, Andover, Mass., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Jun. 21, 1978, Ser. No. 917,459**
**Int. Cl.[2] H05K** *7/20*
**U.S. Cl. 361—388** **4 Claims**



1. An electronic assembly comprising

(A) a circuit board member (**11**) having terminals (**31**) and an interconnecting circuit thereon,

(B) a heat-radiating member (**12**) mounted in substantially parallel, spaced-apart relation to said circuit board member (**11**),

(C) a heat-generating, encapsulated semiconductor device **13** electrically connected to terminals (**31**) on said circuit board, CHARACTERIZED IN THAT said assembly includes,

(1) low thermal impedance means for holding said semiconductor device in electrically insulating, thermally conductive relation in said assembly, said means comprising

(a) a cup-like thermally conductive holder member (**20**) having an internal first shelf surface (**21**) engaging at least a portion of the surface of the encapsulated semiconductor device (**13**) from which heat is dissipated, said member including pin means (**32**) engaging said circuit board (**11**) for preventing rotation therebetween, retaining means at least partially of insulating material (**24**), (**23**), (**22**) within said holder member (**20**) electrically insulatively retaining the semiconductor device (**13**) in engagement with said holder member (**20**), screw means (**28**) for drawing said holder member (**20**) into thermal contact with said heat radiating member (**12**), and

(b) means for enhancing the heat radiation from said heat radiating member (**12**) comprising surface-increasing members (**32**) on the surface of member (**12**) opposite from said holder member (**20**).

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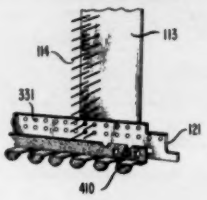
**4,167,032**

## ALIGNMENT APPARATUS FOR CIRCUIT CARD MOUNTINGS

**Henry J. Scagnelli, Upper Montclair, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed May 15, 1978, Ser. No. 906,257**
**Int. Cl.[2] H02B** *1/02*
**U.S. Cl. 361—415** **10 Claims**



1. Apparatus for facilitating the alignment of an electrical circuit card having an edge-mounted connector thereon with a plurality of electrical pin contacts in a circuit card mounting assembly, said assembly including a backplane having affixed thereto said plurality of pin contacts aligned in at least one linear array, the apparatus including:

means, in planar alignment with top and bottom edges of said backplane, for engaging selected edge ones of said aligned pin contacts along a top and bottom of said mounting assembly;

means, in linear alignment with said engaging means and said top and bottom edges of said backplane, for guiding both horizontally and vertically said circuit card into engagement with a linear array of pin contacts which are perpendicularly oriented with respect to said selected edge ones of said aligned pin contacts coupled to said engaging means; and

means, integral with said engaging means, for aligning said guiding means with said aligned pin contacts coupled to said engaging means so that said circuit card edge-mounted connector is keyed in alignment to said linear array of perpendicularly oriented pin contacts through said guiding means and said engaging means.

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**4,167,033**

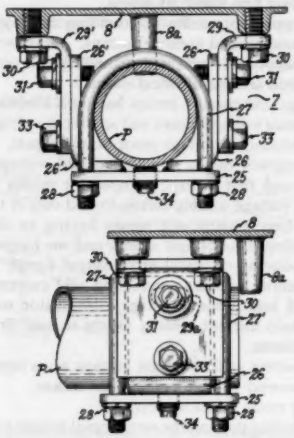
## LUMINAIRE MOUNTING DEVICE

**Thomas A. Fletcher, Dana, N.C., assignor to General Electric Company, Schenectady, N.Y.**

**Filed Oct. 6, 1977, Ser. No. 840,069**
**Int. Cl.[2] F21S** *1/10;* **F21V** *21/10, 21/14;* **F16M** *13/02*
**U.S. Cl. 362—396** **9 Claims**

1. Mounting device for a luminaire adapted to be mounted on an elongated support comprising, in combination, a support member, a pair of spaced bracket members secured to and projecting from said support member, a base member spaced from said support member, a pair of brace members secured to said base member and projecting therefrom toward said support member in juxtaposed relation respectively to said bracket members, and clamping means adjustably secured to said base member defining a passage between said brace members for receiving the elongated support along the axis of said passage

and for clamping the same therein, said bracket members respectively being adjustably secured to said brace members for



adjustment relative thereto about an axis transverse said first mentioned axis.

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**4,167,034**

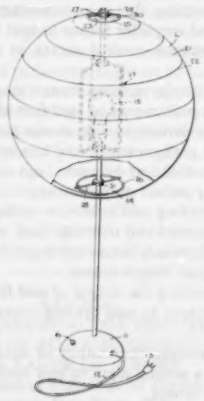
## LAMPSTAND FOR LAMPSHADE

**Isamu Noguchi, 333 E. 69th St., New York, N.Y. 10021**

**Filed Nov. 11, 1977, Ser. No. 850,790**

**Int. Cl.[2] F21S** *1/02, 1/12;* **F21V** *17/06*

**U.S. Cl. 362—414** **7 Claims**



1. A lampstand in combination with a lampshade in the form of a collapsible oriental lantern having a shell with polar openings, each bridged by a strut having a midpoint loop, said stand comprising:

A a vertical pole;

B a socket supported at the upper end of the pole for receiving a light bulb; and

C a harp constituted by a symmetrical array of at least three wires arranged to encage said bulb and interconnecting a lower ring attached to said pole at a point below said socket and an upper ring in axial alignment with the pole:

D a replaceable extension rod whose lower end is received in the upper ring and is supported thereby in axial alignment with the pole to provide a rod head at a selected height, the upper polar loop of said lantern being secured to said rod head, the length of the rod being appropriate to the size of the lantern; and

E a resilient collar on said pole which engages the lower polar loop of said lantern and is shiftable to force the lower loop downwardly to tension said shell and thereby maintain the lantern in its fully expanded state.

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**4,167,035**

## VOLTAGE MULTIPLIERS

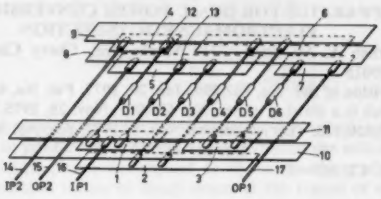
**Gerald A. Willard, Carshalton, England, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Jul. 25, 1977, Ser. No. 818,313**

**Claims priority, application United Kingdom, Aug. 5, 1976, 32679/76**

**Int. Cl.[2] H02M** *7/00*

**U.S. Cl. 363—60** **8 Claims**



1. A voltage multiplier comprising a plurality of series-connected diodes and a plurality of capacitors coupled to the diodes, the capacitors being arranged in two separate capacitor winding rolls; wherein the rolls are arranged side-by-side with their axes coaxially aligned, the diodes comprising wire lead means serving as lead-out wires from the capacitor electrodes to the respective diodes; whereby the need for extra connections intermediate the electrodes and the diodes is eliminated.

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**4,167,036**

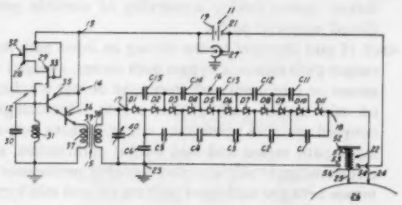
## DC VOLTAGE CONVERTER AND SHOCK-TYPE HIGH VOLTAGE UTILIZATION DEVICES

**Frank M. Kenney, Littleton, Colo., assignor to U and I, Ltd., Gering, Nebr.**

**Continuation-in-part of Ser. No. 648,624, Jan. 13, 1976, Pat. No. 4,084,218. This application Aug. 10, 1977, Ser. No. 823,281**

**Int. Cl.[2] H02M** *7/00, 3/335*

**U.S. Cl. 363—61** **29 Claims**



1. A miniature animal training device comprising:

a housing of a size adapted to conform to and fit within the palm of a hand,

a pair of electrodes projecting outwardly from one side of said housing adjacent one end thereof,

a battery mounted in said housing providing a DC voltage,

a DC voltage step-up converter including portions mounted on a circuit board in said housing, said converter including:

an electric oscillator selectively coupled to said battery for converting the DC voltage of said battery to an oscillating voltage;

a low voltage transformer coupled to said oscillator for increasing said oscillating voltage;

a capacitor charging voltage step-up network including a series of charging capacitors that are successively charged by the output voltage of said transformer and having an output terminal for converting said higher oscillating voltage to an increased substantially DC voltage at said output terminal;

an electric switch portion actuated by the movement of one of said electrodes to couple said battery voltage to said oscillator circuit whereby a substantially DC voltage is produced at said output terminal that is applied as an electric shock at said electrodes; and

means adapted for selectively charging said battery in said housing.

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**4,167,037**

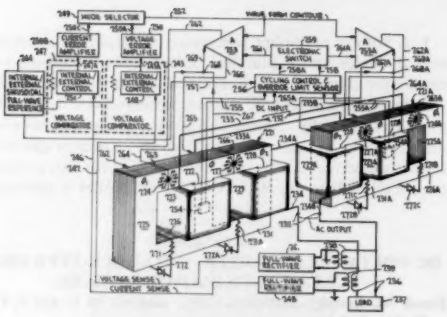
## APPARATUS FOR DC/AC POWER CONVERSION BY ELECTROMAGNETIC INDUCTION

**Nathan A. Moerman, 7310 Maple Ave., Chevy Chase, Md. 20015**

**Division of Ser. No. 762,896, Jan. 26, 1977, Pat. No. 4,112,347, which is a division of Ser. No. 635,007, Nov. 25, 1975, Pat. No. 4,020,440. This application Nov. 8, 1977, Ser. No. 849,564**

**Int. Cl.[2] H02M *7/00***

**U.S. Cl. 363—79** **2 Claims**



1. In an electromagnetic induction means for the conversion of direct current power to alternating current power;

a first and a second identical electrical power pulse transformer means having a plurality of variable permeance closed magnetic paths,

each of said identical means having an input path means, an output path means, a bypass path means, an input winding means on said input path means, an output winding means on said output path means, a first electromagnetically coupled variable permeance control means between said input path means and said output path means, a second electromagnetically coupled variable permeance control means between said input path means and said bypass path means,

a pair of direct current source terminal means,

a means connecting said first and second input winding means in series with said pair of direct current source terminal means,

a current sensing means,

a voltage sensing means,

a first and a second alternating current output terminal means;

a means connecting said first and second output winding means in series opposing configuration;

a first, second, third and fourth reverse transient suppression means, each having a winding means, and a unidirectional current flow and energy absorbing means,

said first suppression means surrounding said bypass path means of said first identical means,

said second suppression means surrounding said output path means of said first identical means,

said third suppression means surrounding said bypass path means of said second identical means,

said fourth suppression means surrounding said output path means of said second identical means,

a first voltage comparator means having a alternating current reference voltage means and an output voltage setting means producing a voltage error output signal,

a voltage feedback means connecting said voltage sensing means to said first voltage comparator means and coupling said voltage sensing means to said output terminals,

a second voltage comparator means having an alternating current reference voltage means and an output setting means producing a current error output signal,

a current feedback means connecting said current sensing means and said second voltage comparator means and coupling said current sensing means to said first output terminal means,

means connecting said reference voltage as an input to said first and second voltage comparator means,

an operating mode selector means,

means connecting the voltage error signal output of said first voltage comparator means as a first input to said operating mode selector means,

means connecting the current error signal output of said second voltage comparator means as a second input to said operating mode selector means,

a first and a second complementary control amplifier means,

means connecting the output of said operating mode selector means as the first input to both of said amplifier means,

means connecting the complementary control outputs of said first amplifier means to said first and second variable permeance control means in said first identical means,

means connecting the complementary control outputs of said second amplifier means to said first and second variable permeance control means in said second identical means,

a first flux density sensing means magnetically coupled to said input path means of said first identical means,

a second flux density sensing means magnetically coupled to said input path means of said second identical means,

a cycling control and override limit sensor having a pair of alternately pulsed output means,

means connecting said reference voltage as an input to said cycling control and override limit sensor,

an electronic switch means having a first and a second alternating signal output means,

means connecting the output of said first flux density sensor as a first input to said cycling control and override limit sensor,

means connecting the output of said second flux density sensor as a second input to said cycling control and override limit sensor,

means connecting the outputs of said cycling control and override limit sensor as the controlling inputs to said electronic switch means,

means connecting said first output of said electronic switch means as a second input to said first amplifier means,

means connecting said second output of said electronic switch means as a second input to said second amplifier means,

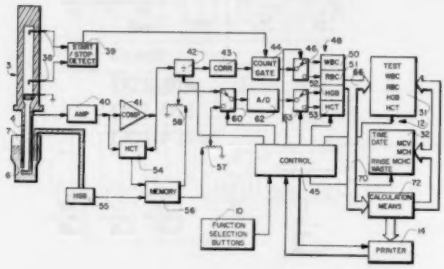
whereby said electronic switch is enabled by actuating control signals from the zero crossover points of the said alternating current reference voltage and in the absence thereof, by a protective override control signal in response to the outputs of said flux density sensors, and

whereby the alternating current output across said output terminal means is a series of out-of-phase contiguous shaped power pulse lobes to produce an alternating sine wave output.

## 4,167,038
## CALCULATED PARAMETER GENERATION IN A HEMATOLOGY PARAMETER MEASUREMENT APPARATUS

James W. Hennessy, Trumbull, Conn., assignor to Hycel, Inc., Houston, Tex.

Filed Oct. 17, 1977, Ser. No. 842,508
Int. Cl.[2] G01N *27/00*; G06F *15/42*
U.S. Cl. 364—416 7 Claims




1. In a hematology parameter measuring apparatus for producing outputs indicative of measured values including transducer means for producing signals indicative of parameter values and register means for storing indications of measured values, the improvement of means for producing calculated parameter values comprising: calculation means for calculating a calculated value as a function of measured values supplied thereto and comprising a digital divider having a dividend register and a divisor register, control means for commanding generation of calculated parameter values and means for supplying preselected measured values from said register means in a preselected sequence to said calcuation means in response to an input from said control means, wherein said register means comprises parameter registers, and said means for supplying preselected measured value comprises means for circulating a value from one of said parameter registers to one of said registers in said digital divider and means for applying a source of clock pulses for incrementing said parameter register by a number of counts to return to its original setting, means for sensing the overflow of said parameter register, and means for providing to each said register in said digital divider a multiple of the number of counts provided to the parameter register after overflow until the provision of the number of counts to the parameter register is completed, whereby said calculation means provides an output indicative of a calculated value.

## 4,167,039
## DEVICE FOR MEASURING THE DISTRIBUTION OF THE ABSORPTION OF THE EMISSION OF RADIATION IN A LAYER OF A BODY

Gunter Kowalsi, Hamburg, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

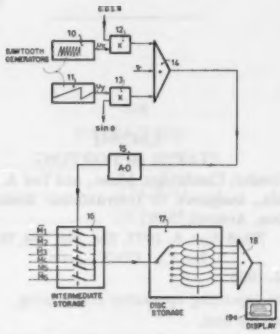
Continuation of Ser. No. 685,271, May 11, 1976, abandoned.
This application Mar. 10, 1978, Ser. No. 885,299
Claims priority, application Fed. Rep. of Germany, May 13, 1975, 2521171
Int. Cl.[2] G01T *1/29*
U.S. Cl. 364—515 8 Claims

1. An improved device for computing and displaying the spatial distribution of physical characteristics in a layer of a body from signal values which are derived from measurements made by a radiation source and one or more radiation detectors in a multiplicity of measuring series along a corresponding multiplicity of directions in the layer comprising:

an allocation device which, for each measuring series, assigns one of the signal values to each of a multiplicity of image points, each assigned signal value having been produced in the same strip in which the associated image point is siturated;

storage means connected to accumulate and store all of the assigned signal values for each image point;

summing means connected to receive and superpose all of the signal values for each image point to produce a superposed value for that image point; and

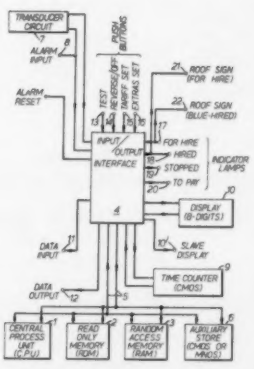



display means connected to receive the superposed values and to produce therefrom a display wherein the values of displayed points correspond to the mean-value of the superposed values of image points in the region of each displayed point.

## 4,167,040
## TAXIMETER INDICATING DEVICES

Francis R. Heritier, London, and Christopher W. Iles, Newton Ferrers, both of England, assignors to Plessey Handel und Investments AG Zug, Switzerland

Filed Dec. 15, 1976, Ser. No. 750,915
Claims priority, application United Kingdom, Dec. 15, 1975, 51294/75
Int. Cl.[2] G07B *13/04*
U.S. Cl. 364—900 44 Claims




1. A taximeter encased in a housing, said taximeter comprising processing means for carrying out computations to determine a charge, storage means for storing a plurality of constants constituting a tariff structure in accordance with which said charge to be made is derived, means for interconnecting said processing means and said storage means wherein said processing means controls the storage means to read the contents of said storage means into said processing means without destroying the contents of said storage means, and data transfer means interconnected with said processing means and storage means and operable under the control of the processing means and operative on the storage means for electronically changing the constants of said tariff structure stored in said storage

means without removing any part of the storage means from within said housing.

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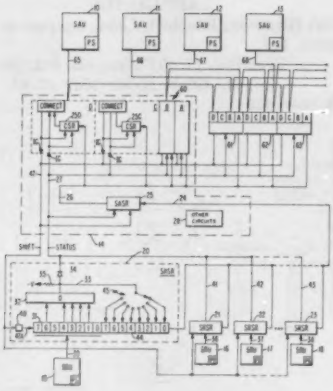
**4,167,041**

## STATUS REPORTING

**Paul J. Curlander, Cambridge, Mass., and Ted A. Rehage, Longmont, Colo., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Apr. 5, 1977, Ser. No. 784,751**
**Int. Cl.[2] G06F *11/06***
**U.S. Cl. 364—900** **17 Claims**

1. A status reporting apparatus comprising,
an addressable unit,
a first register having a plurality of stages for receiving status signals to be reported from said addressable unit,
a second register having a plurality of stages,
a first OR circuit receiving status signals from said first register and supplying a status group signal to one stage of



said second register having a position within said second register indicating address of said addressable unit.

# DESIGN PATENTS

## GRANTED SEP. 4, 1979

### ERRATA

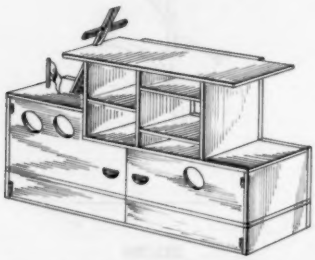
| For CLASS | See PATENT NO. |
|---|---|
| D21-074 | 252,829 |
| D21-092 | 252,830 |
| D03-035 | 252,835 |

# DESIGNS

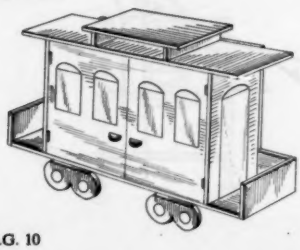
## SEPTEMBER 4, 1979

252,776
CANDY
Roy K. Wills, Jr., Oxford, Ohio, assignor to International Leisure Activities, Inc.
Filed Oct. 7, 1977, Ser. No. 840,514
Term of patent 14 years
Int. Cl. D01—*01*
U.S. Cl. D1—15

252,777
STORAGE CABINET OR SIMILAR ARTICLE
Tad Taylor, 31 Byram Shore Rd., Byram, Conn. 06830
Filed Jun. 17, 1977, Ser. No. 807,417
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—5



252,778
STORAGE CABINET OR SIMILAR ARTICLE
Tad Taylor, 31 Byram Shore Rd., Byram, Conn. 06830
Filed Jun. 17, 1977, Ser. No. 807,420
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—5

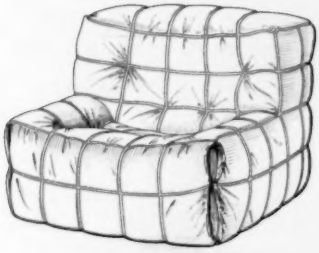


252,779
DISPLAY STAND
John Mogelhoj, Olstykke, Denmark, assignor to Aktieselskabet Lagerman Junr., Glostrop, Denmark
Filed Sep. 6, 1977, Ser. No. 830,898
Claims priority, application Denmark, Mar. 11, 1977, 192/77
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—28

252,780
DISPLAY RACK
Edward N. Green, Rome, Ga., assignor to WWG Industries, Inc., Rome, Ga.
Filed Apr. 25, 1977, Ser. No. 790,749
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—29

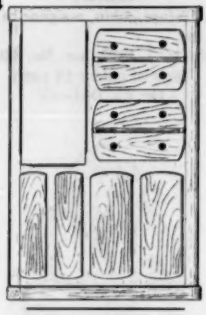
252,781
SECRETARIAL ARM CHAIR
Douglas C. Ball, Senneville, Canada, assignor to Hausermann Ltd.
Filed Jun. 27, 1977, Ser. No. 810,651
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—31

252,782
CHAIR
Pierre Roset, Montagnieu, France, assignor to Roset S.A., of Briord France, Serrieres de Briord, France
Filed Apr. 22, 1977, Ser. No. 790,103
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—66



252,783
LIQUID DISPENSER
Leandro P. Rizzuto, Lakewood, N.J., assignor to Conair Corporation, Edison, N.J.
Filed Mar. 18, 1977, Ser. No. 778,873
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D6—95

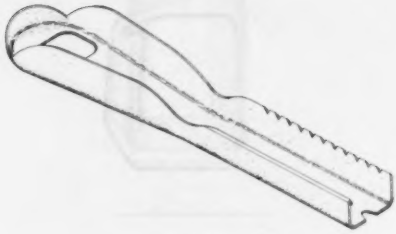
252,784
SERVER
Huey T. Keller, High Point, N.C., assignor to Vaughan Furniture Company, Inc., Galax, Va.
Filed Aug. 8, 1977, Ser. No. 822,609
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—164



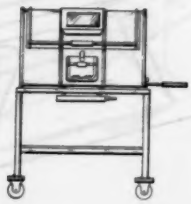
252,785
VIAL HOLDER ARM UNIT OR SIMILAR ARTICLE
Harry H. Horne, 408 S. Jupiter Rd. #212, Garland, Tex. 75042
Filed Feb. 22, 1977, Ser. No. 770,469
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—191

252,786
COMBINED GAS CYLINDER AND CONTROL HANDLE FOR A CHAIR
Frank Doerner, 138 Aberdeen Rd., Kitchener, Ontario, Canada (N2M 2Y7)
Filed Jul. 18, 1977, Ser. No. 816,258
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—191

252,787
**COMBINED FISH SCALER, BOTTLE OPENER AND HOOK DEGOUGER OR THE LIKE**
Ernest T. Jefferson, 105 N. Shetland Ct., Garner, N.C. 27529
Filed May 4, 1977, Ser. No. 793,768
Term of patent 14 years
Int. Cl. D7—*04, 06*
U.S. Cl. D7—99



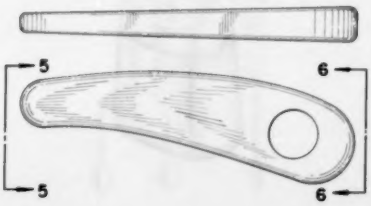
252,788
**BARBEQUE**
Donald L. Talbert, 6110 Magnolia, Mt. Morris, Mich. 48458
Filed Sep. 2, 1977, Ser. No. 830,366
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—108



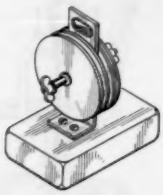
252,789
**SPOON OR SIMILAR ARTICLE OF FLATWARE**
Ben Seibel, New York, N.Y., assignor to Oxford Hall Silversmiths, Ltd., New York, N.Y.
Filed Oct. 20, 1977, Ser. No. 843,996
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137

252,790
**KNIFE**
Merwyn R. Reinschreiber, Cleveland Heights, Ohio, assignor to Cole National Corporation
Filed Sep. 22, 1977, Ser. No. 835,842
Term of patent 14 years
Int. Cl. D07—*03*
U.S. Cl. D7—150

252,791
**HANDLE FOR A KNIFE OR SIMILAR ARTICLE**
Merwyn R. Reinschreiber, Cleveland Heights, Ohio, assignor to Cole National Corporation
Filed Sep. 22, 1977, Ser. No. 835,841
Term of patent 14 years
Int. Cl. D07—*03*
U.S. Cl. D7—152

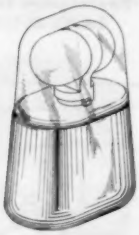


252,792
COPPER FOIL HOLDER
George C. Hobbs, Sacramento, Calif., assignor to J. Gonzalez Hobbs, Sacramento, Calif.
Filed Nov. 26, 1976, Ser. No. 745,986
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—358



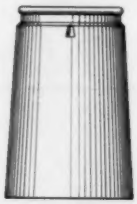
252,793
DRAPERY TRACK
Ellis I. Toder, 341 Militia Hill Rd., Fort Washington, Pa. 19034
Filed Jul. 5, 1977, Ser. No. 812,502
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—377

252,794
COMBINED BOTTLE AND APPLICATOR
Michael P. Lucas, Hingham, Mass., assignor to The Gillette Company, Boston, Mass.
Filed May 16, 1977, Ser. No. 797,031
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—10

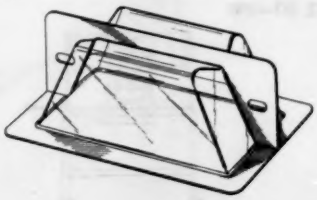


252,795
BOTTLE
Paul R. Campbell, Cincinnati, Ohio, and John Pardo, Yonkers, N.Y., assignors to The Procter & Gamble Company, Cincinnati, Ohio
Filed Feb. 23, 1977, Ser. No. 771,238
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—43

252,796
CONTAINER FOR FOOD PRODUCTS OR THE LIKE
Vincent E. Fortuna, and Matt Lerner, both of Coleman, Mich., assignors to Vercon, Inc., Coleman, Mich.
Filed Apr. 7, 1977, Ser. No. 785,659
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—147

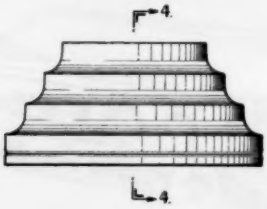


252,797
PACKAGING CONTAINER
Donald C. Fuller, Old Duston, England, assignor to The Mettoy Company Limited, Old Duston, England
Filed Apr. 20, 1977, Ser. No. 789,443
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—192

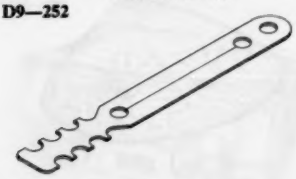


252,798
**PACKAGING CONTAINER FOR FOOD OR THE LIKE**
Donald C. Vosti, Crystal Lake, Ill., and Alan Silverman, Norwalk, Conn., assignors to American Can Company, Greenwich, Conn.
Filed Nov. 22, 1976, Ser. No. 744,161
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—216

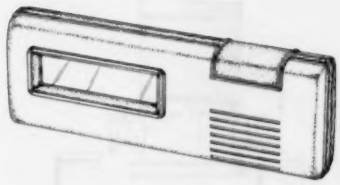
252,799
**PACKAGING CONTAINER**
Kinichiro Yamaguchi, Tokyo, Japan, assignor to Kabushiki Kaisha Ekijibishon, Tokyo, Japan
Filed Mar. 10, 1977, Ser. No. 776,196
Claims priority, application Japan, Sep. 21, 1976, 51-37687
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—216



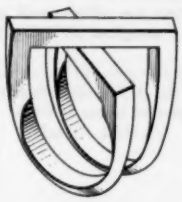

252,800
**SAUSAGE CASING HANGER MEMBER**
Donald J. Ernst, Milwaukee, Wis., assignor to Rheem Manufacturing Company
Filed Nov. 8, 1976, Ser. No. 739,941
Term of patent 14 years
Int. Cl. D9—*06*
U.S. Cl. D9—252



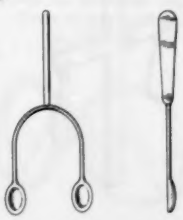
252,801
**CLOCK**
Genji Usuda, Hachioji, Japan, assignor to Citizen Watch Co., Ltd., Tokyo, Japan
Filed Jul. 15, 1977, Ser. No. 816,509
Claims priority, application Japan, Feb. 17, 1977, 52-5100
Term of patent 3½ years
Int. Cl. D10—*01*
U.S. Cl. D10—15



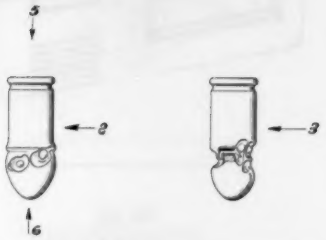
252,802
**RING**
Jay H. Lavin, 526 N. Larchmont, Los Angeles, Calif. 90004
Filed Dec. 30, 1977, Ser. No. 865,887
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—29



252,803
**PENDANT OR THE LIKE**
Le Roy Parker, 4133 W. 22nd Pl., Los Angeles, Calif. 90018
Filed Apr. 28, 1977, Ser. No. 792,025
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—79



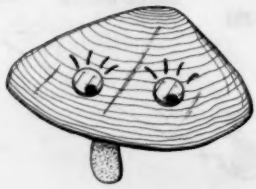
252,804
CHARM
Lilia O. Lee, 7800 Henefer Ave., Los Angeles, Calif. 90045
Filed Dec. 23, 1974, Ser. No. 535,285
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—81



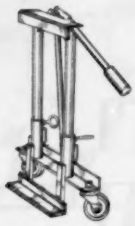

252,805
JEWELRY PENDANT
Olivia M. Mitchum, 661 E. 50th St., Chicago, Ill. 60615
Filed Oct. 25, 1977, Ser. No. 845,245
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—96

252,806
WALL HANGING
Gabriele Richter nee Redomske, 8 Wiesenstrasse, D-5481 Remagen-Unkelbach, Fed. Rep. of Germany
Filed Sep. 14, 1976, Ser. No. 723,193
Claims priority, application Fed. Rep. of Germany, May 18, 1976, 123
Term of patent 7 years
Int. Cl. D11—*05*
U.S. Cl. D11—129

252,807
STATUETTE
George A. Schnyderite, and Margaret A. Dunagan, both of 12 Woodland Ave., Keansburg, N.J. 07734
Filed Apr. 12, 1977, Ser. No. 786,795
Term of patent 7 years
Int. Cl. D11—*02*
U.S. Cl. D11—158

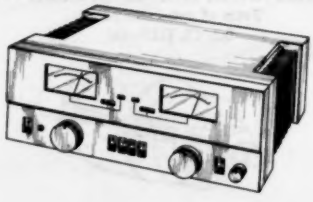


252,808
MOBILE LIFT FOR ELEVATING AND TRANSPORTING A HEAVY OBJECT SUCH AS A REFRIGERATOR
Earle F. Prater, Long Beach, Calif., assignor to Roofing Equipment Company
Filed Mar. 27, 1978, Ser. No. 890,837
Term of patent 14 years
Int. Cl. D12—*02*
U.S. Cl. D12—34

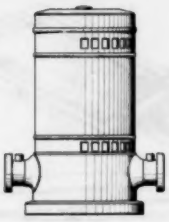


252,809
AMPLIFIER
John J. Bocko, Fort Wayne, Ind., assignor to The Magnavox Company, Fort Wayne, Ind.
Filed Jul. 7, 1977, Ser. No. 813,744
Claims priority, application Benelux, Jan. 12, 1977, 5159301
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—96

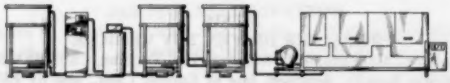
252,810
AMPLIFIER
John J. Bocko, Fort Wayne, Ind., assignor to The Magnavox Company, Fort Wayne, Ind.
Filed Jul. 7, 1977, Ser. No. 813,746
Claims priority, application Benelux, Jan. 12, 1977, 5159302
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—96



252,811
CENTRIFUGAL PUMP
Shinichiro Arakawa, Kanagawa, Japan, assignor to Ebara Corporation, Tokyo, Japan
Filed Jul. 15, 1977, Ser. No. 816,145
Claims priority, application Japan, Jan. 19, 1977, 52-1263
Term of patent 14 years
Int. Cl. D15—*02*
U.S. Cl. D15—7

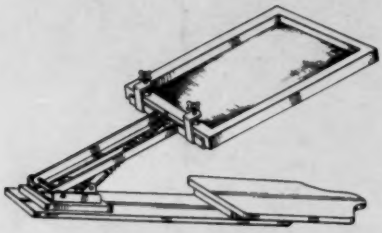


252,812
WATER TREATMENT DISWASHING APPARATUS
James P. Andrews, Kennersville, and Arthur C. Callahan, Winston-Salem, both of N.C., assignors to American Sterilizer Company, Erie, Pa.
Continuation-in-part of Ser. No. 614,775, Sep. 19, 1975, abandoned. This application Jul. 8, 1977, Ser. No. 813,983
Term of patent 14 years
Int. Cl. D15—*05*
U.S. Cl. D15—35



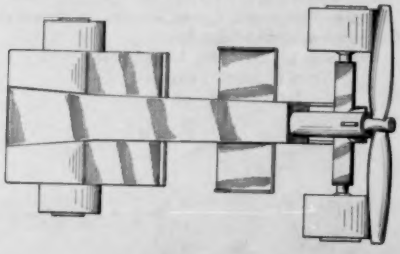
252,813
PAIR OF SPECTACLES
David W. Johnsen, Woodstock, Conn., assignor to American Optical Corporation, Southbridge, Mass.
Filed Sep. 12, 1977, Ser. No. 832,244
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—65

252,814
SILK SCREEN PRINTER
William P. Rands, 12910 Venice Blvd., Los Angeles, Calif. 90066
Filed Sep. 15, 1976, Ser. No. 723,590
Term of patent 14 years
Int. Cl. D18—*02*
U.S. Cl. D18—14

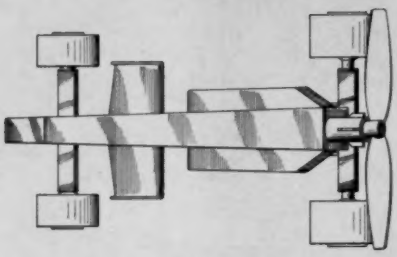


252,815
SHAFT FOR A MARKING INSTRUMENT
Melvin C. Coffman, 1326 S. Elizabeth, Denver, Colo. 80210
Continuation-in-part of Ser. No. 480,120, Jun. 17, 1974, abandoned. This application Aug. 27, 1976, Ser. No. 718,314
Term of patent 14 years
Int. Cl. D19—*06*
U.S. Cl. D19—54

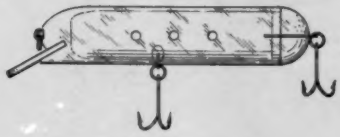
252,816
PROPELLER DRIVEN TOY VEHICLE
Adolph E. Goldfarb, 4614 Monarca Dr., Tarzana, Calif. 91345; Erwin Benkoe, deceased, late of Encino, Calif., and by Elisabeth Benkoe, executrix, 17965 Medley Dr., Encino, Calif. 91316
Filed Aug. 5, 1977, Ser. No. 822,042
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—76



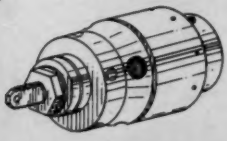
252,817
PROPELLER DRIVEN TOY VEHICLE
Adolph E. Goldfarb, 4614 Monarca Dr., Tarzana, Calif. 91345; Erwin Benkoe, deceased, late of Encino, Calif., and by Elisabeth Benkoe, executrix, 17965 Medley Dr., Encino, Calif. 91316
Filed Aug. 5, 1977, Ser. No. 822,043
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—76



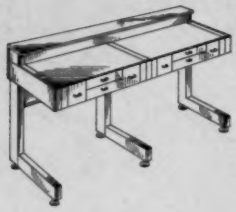
252,818
HOLLOW TRANSPARENT FISHING LURE
James R. Cope, 10500 Cherokee La., Leawood, Kans. 66206
Filed Aug. 8, 1977, Ser. No. 822,619
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—28



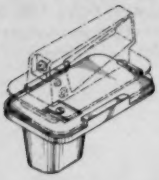
252,819
HIGH-PRESSURE ROTARY NOZZLE
John D. Watson, 906 E. Harmony La., Fullerton, Calif. 92631
Filed Nov. 21, 1977, Ser. No. 853,629
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—34



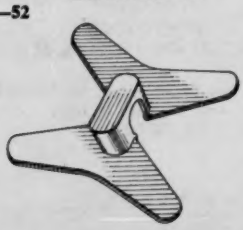
252,820
LABORATORY TABLE
Donald F. Olson, St. Charles, Ill., assignor to St. Charles Manufacturing Company, St. Charles, Ill.
Filed Jul. 27, 1977, Ser. No. 819,229
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D24—1.1



252,821
PEDIATRIC PADDLE ATTACHMENT FOR DEFIBRILLATOR PADDLE
John M. Moore, Redmond, and David B. Smith, Mercer Island, both of Wash., assignors to Physio-Control Corporation, Redmond, Wash.
Filed Sep. 11, 1978, Ser. No. 942,751
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D24—29

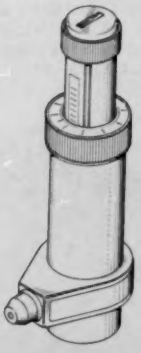


252,822
DEVICE FOR THE SECUREMENT AND PROTECTION OF A CATHETER PLACEMENT ASSEMBLY
Richard H. McFarlane, 506 Tyler Rd., St. Charles, Ill. 60174
Filed Mar. 15, 1977, Ser. No. 777,621
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D24—52



252,823
PIPETTE
Stanley J. Withers, Berkeley, and Ronald L. Sturm, San Carlos, both of Calif., assignors to Oxford Laboratories, Inc.
Filed Jun. 6, 1977, Ser. No. 803,899
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—55

252,824
JAR MOUNTED PIPETTOR
James C. Smith, Hayward, and Stanley J. Withers, Berkeley, both of Calif., assignors to Oxford Laboratories, Inc.
Filed Jul. 18, 1977, Ser. No. 816,903
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—55

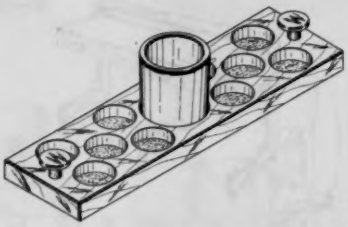


252,825
LIGHTER
Gilles Lauri, Villa Lou Maria, Avenue de la Bordes, Mougins, France
Filed Jun. 14, 1977, Ser. No. 807,644
Claims priority, application France, Dec. 23, 1976, 76 657
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—36

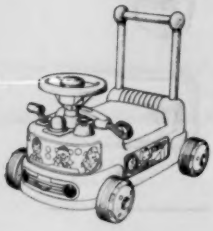
252,826
COMB
Roydon J. P. Bakewell, Northampton, England, assignor to Colt Combs Limited, Northampton, England
Filed Jul. 27, 1977, Ser. No. 819,373
Claims priority, application United Kingdom, May 12, 1977, 980010/77
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—22

252,827
MANICURE TRAY
Elizabeth G. Davidson, 1046 Calle Mesita, Bonita, Calif. 92002
Filed Nov. 23, 1977, Ser. No. 854,464
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—61

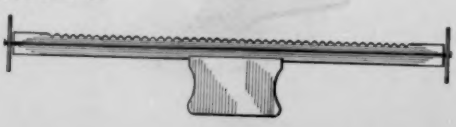
252,828
NAIL POLISH TRAY
Elizabeth G. Davidson, 1046 Calle Mesita, Bonita, Calif. 92002
Filed Dec. 9, 1977, Ser. No. 859,076
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—61



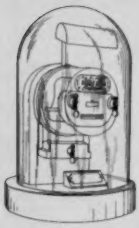
252,829
TOY VEHICLE
Shinroku Nakao, Yokohama; Yoshiyasu Ishii, and Kazuo Nagata, both of Tokyo, all of Japan, assignors to Combi Co., Ltd., Tokyo, Japan
Filed Apr. 19, 1977, Ser. No. 788,946
Claims priority, application Japan, Oct. 26, 1976, 51-42313
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—74



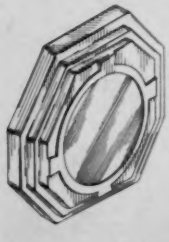
252,830
SPINNING TOY
Wilbert S. Johnson, 3237-47th Ave. South, Minneapolis, Minn. 55406
Filed Aug. 25, 1977, Ser. No. 827,824
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—92



252,831
COMBINED LAMP AND METER
James M. Sovaiko, 807 Center St., Throop, Pa. 18512
Filed Apr. 28, 1977, Ser. No. 791,883
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—20 D

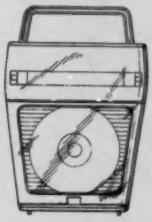


252,832
ENTERTAINMENT LIGHT DISPLAY UNIT
Roger C. Bowser, Apache Junction, Ariz., assignor to Retinal Circus Corporation
Continuation-in-part of Ser. No. 731,111, Oct. 12, 1976, abandoned, and a continuation-in-part of Ser. No. 731,112, Oct. 12, 1976, abandoned. This application Jul. 5, 1977, Ser. No. 813,103
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—20 E

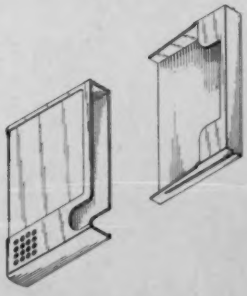


252,833
ENTERTAINMENT LIGHTING DISPLAY UNIT
Roger C. Bowser, Apache Junction, Ariz., assignor to Retinal Circus Corporation
Continuation-in-part of Ser. No. 731,111, Oct. 12, 1976, abandoned. This application Jul. 5, 1977, Ser. No. 813,104
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—20 E

252,834
LANTERN
Wan K. Yip, Kowloon, Hong Kong, assignor to Chung Ah Manufacturing Company, Limited, Hong Kong, China
Filed Oct. 20, 1977, Ser. No. 844,067
Term of patent 14 years
Int. Cl. D26—*02*
U.S. Cl. D48—24 R



252,835
CASSETTE HOLDER
Vincenzo Meille, Milan, Italy, assignor to Arnoldo Mondadori Editore S.p.A.
Filed Apr. 1, 1977, Ser. No. 783,862
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D3—35



# LIST OF PATENTEES

TO WHOM

## PATENTS WERE ISSUED ON THE 4TH DAY OF SEPTEMBER, 1979

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. C. Nielsen Company: *See*—
Marshall, Robert, 4,166,540, Cl. 209-555.000.

A/S Hydraulik Brattvaag: *See*—
Martinussen, Svein; Roaldsnes, Leiv; and Roed, Harald, 4,166,545, Cl. 414-139.000.

AB Bygg-och Transportekonomi (BT): *See*—
Oberg, Lars-Gunnar, 4,166,712, Cl. 414-732.000.

AB Motala Verkstad: *See*—
Sundqvist, Hans E., 4,166,499, Cl. 165-134.00R.

Abbott Laboratories: *See*—
Jones, Peter H.; Bariana, Dilbagh S.; Fung, Anthony K. L.; Martin, Yvonne C.; Kyncl, Jaroslav; and Lall, Amrit, 4,166,819, Cl. 548-253.000.
Plattner, Jacob J.; Voss, Houston F.; and Magic, Susan E., 4,166,825, Cl. 260-455.00R.

Abramov, Valentin S.: *See*—
Stepantsov, Georgy K.; Abramov, Valentin S.; Bloschitsyn, Jury N.; Zaripov, Raif R.; Babko, Alexandr A.; Kutlin, Ferdinand K.; Glazunov, Ivan V.; Nilov, Alexei A.; Kuznetsov, Gennady V.; Viter, Petr A.; Pavlov, Alexandr F.; Belonog, Valery M.; Korneev, Vladimir A.; and Zvereva, Emilia I., 4,166,375, Cl. 72-430.000.

Abramson, Harvey J., to Metatech Corporation. Device and procedure for collecting a succession of intravenous blood samples. 4,166,450, Cl. 128-764.000.

Abramson, Harvey J., to Metatech Corporation. Bite block for endotracheal tube. 4,166,467, Cl. 128-351.000.

ACF Industries, Incorporated: *See*—
Baker, Thomas B.; and Sittner, Edward H., 4,166,520, Cl. 188-33.000.

Acimovic, Simeon; Lindemann, Karl H.; and Kunz, Volker G. Cyanide-free alkaline zinc baths. 4,166,778, Cl. 204-55.00R.

Acme-Cleveland Development Company: *See*—
Haner, Lambert, 4,166,991, Cl. 335-261.000.

Adamek, David, to Champion International Corporation. Cylinder style display box. 4,166,529, Cl. 206-45.340.

Adeboi, Frans L.: *See*—
Kawolics, Raymond P.; Basel, Donald R.; and Adeboi, Frans L., 4,166,606, Cl. 251-214.000.

Agejev, Georgij S.: *See*—
Heller, Laszlo; Forgo, Laszlo; Papp, Istvan; Bodas, Janos; Agejev, Georgij S.; Alekszejev, Ivan A.; and Minaszjan, Ruben G., 4,166,339, Cl. 47-17.000.

AGFA-Gevaert, A.G.: *See*—
Schausberger, Helmut; Bruckl, Konrad; and Sailer, Gunther, 4,166,689, Cl. 354-321.000.

Ahmed, Adel A. A., to RCA Corporation. Inverting buffer circuit. 4,166,964, Cl. 307-296.00R.

Ai, Mitsuo: *See*—
Matsuda, Yasumasa; Yamada, Kazuji; Shimada, Satoshi; Nishihara, Motohisa; Yasuda, Tomio; Tsuchiya, Masatoshi; Soeno, Ko; Ai, Mitsuo; Nagata, Takeo; and Matsuoka, Yoshitaka, 4,166,384, Cl. 73-141.00A.

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Stockman, Richard F., 4,166,496, Cl. 165-9.000.

Air Products and Chemicals, Inc.: *See*—
Ruprecht, David R.; and Lovette, Norris G., 4,166,364, Cl. 62-384.000.

Aisin Seiki Kabushiki Kaisha: *See*—
Yamanaka, Minoru; and Kawabata, Yasuhiro, 4,166,476, Cl. 137-103.000.

Aiwa Co., Ltd.: *See*—
Sambe, Yusuke; and Kanoi, Nobuo, 4,167,026, Cl. 360-15.000.

Akimura, Yoshitaka: *See*—
Mifune, Hiroyuki; Takada, Shunji; Akimura, Yoshitaka; and Shishido, Tadao, 4,166,742, Cl. 96-107.000.

Albert, Robert E., to Du Pont de Nemours, E. I., and Company. Rotating fluid jet agitator. 4,166,704, Cl. 366-167.000.

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Renton, Stanley, 4,166,719, Cl. 23-230.00R.

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Alford, Peter B.; and Peaks, David F., to El-Jay, Inc. Impact crusher table construction. 4,166,585, Cl. 241-275.000.

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Bruno, Carlo L., 4,166,525, Cl. 198-437.000.

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Pikel, John H., 4,166,836, Cl. 422-308.000.

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Hahn, Kurt L.; and Allen, Robert J., 4,166,424, Cl. 113-114.0BE.

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Mastroianni, Martin J.; Orfeo, Sabatino R.; and Sukornick, Bernard, 4,166,798, Cl. 252-63.500.
Tunick, Allen A.; Koff, Fred W.; and Sifniades, Stylianos, 4,166,842, Cl. 423-387.000.

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Aloupis, Harry. Fusion chamber. 4,166,761, Cl. 176-7.000.

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Yu, Ho, 4,166,495, Cl. 164-89.000.

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Johnson, Glenn W., Jr., 4,166,430, Cl. 116-202.000.
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Gilling, Donald A., 4,166,535, Cl. 206-470.000.
Hahn, Kurt L.; and Allen, Robert J., 4,166,424, Cl. 113-114.0BE.

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Bullard, Jack R., 4,166,427, Cl. 114-251.000.

American Cyanamid Company: *See*—
Henderson, William A., Jr., 4,166,824, Cl. 260-429.00R.
Lutz, Albert W.; and Diehl, Robert E., 4,166,908, Cl. 544-166.000.

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Herrmann, Henry O., Jr., 4,166,664, Cl. 339-91.00R.

Anderson, Jay. Organic digester apparatus. 4,166,835, Cl. 422-184.000.

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Anderson, Victor F., to Shell Oil Company. Aerosol safety cap having hinged nozzle. 4,166,554, Cl. 222-182.000.

Ando, Momofuku; Minami, Junichi; Takatsu, Mitsumune; Ohnishi, Fumio; and Sawada, Makoto, to Ando, Momofuku. Manufacture of ready-to-eat rice. 4,166,868, Cl. 426-441.000.

Ango, Alvino J. Variable lift advancing wing aircraft. 4,166,595, Cl. 244-20.000.

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Annas, Dulin L., Sr. Apparatus for removing flaccid articles from forms and stacking the articles in laid out condition. 4,166,556, Cl. 223-112.000.

Antus, Sandor: *See*—
Feuer, Laszlo; Nogradi, Mihaly; Gettsegen, Agnes; Vermes, Borbala; Strelisky, Janos; Wolfner, Andras; Farkas, Lorant; Antus, Sandor; and Toth, Maria K., 4,166,862, Cl. 424-283.000.

Aomori, Kokichi: *See*—
Inoyama, Tadao; Aomori, Kokichi; and Terai, Hidekazu, 4,166,945, Cl. 235-379.000.

Aoshima, Masashi: *See*—
Maeda, Isamu; and Aoshima, Masashi, 4,166,892, Cl. 525-373.000.

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Applied Films Lab, Inc.: *See*—
Chapin, John; and Condon, Charles R., 4,166,784, Cl. 204-192.00R.

Araki, Shigeru: *See*—
Misawa, Yoshihiko; Mori, Kazuhiro; and Araki, Shigeru, 4,166,316, Cl. 29-626.000.

Arand, John K.: *See*—
Guth, Eugene D.; Daly, LeGrand A.; and Arand, John K., 4,166,830, Cl. 252-373.000.

Araujo, Roger J.; and Tick, Paul A., to Corning Glass Works. Refractive index-corrected copper-cadmium halide photochromic glasses. 4,166,745, Cl. 106-47.00Q.

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Montren, William T., 4,166,389, Cl. 73-343.00R.

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Bernardi, Luigi; Masi, Paolo; Suarato, Antonino; and Arcamone, Federico, 4,166,848, Cl. 424-180.000.

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Arlt, Dieter: *See*—
Hoffmann, Hellmut; Arlt, Dieter; Hammann, Ingeborg; Homeyer, Bernhard; and Stendel, Wilhelm, 4,166,850, Cl. 424-220.000.

Artos Engineering Company: *See*—
Gudmestad, Ragnar; and Blaha, Gerald E., 4,166,315, Cl. 29-564.400.

Asano, Kiyoji, to Shinsei Kogyo Co., Ltd. Steering system for radio or wire controlled traveling toys. 4,166,338, Cl. 46-253.000.

Asano, Takeshi: *See*—
Sakamoto, Koji; Asano, Takeshi; Mizuochi, Kazuo; Sasaki, Kanemichi; and Hasegawa, Kouji, 4,166,865, Cl. 424-285.000.

ASEA Aktiebolag: *See*—
Dahlstrom, Lars, 4,166,543, Cl. 414-749.000.

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Ataka Kogyo Kabushiki Kaisha: *See*—
Shimomoto, Tsunemitsu, 4,166,801, Cl. 252-361.000.

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Shepperd, David M., 4,167,019, Cl. 358-22.000.

Atlantic Richfield Company: *See*—
Kesling, Haven S., Jr.; and Zehner, Lee R., 4,166,913, Cl. 560-204.000.

Atsukawa, Masumi: *See*—
Tatani, Atsushi; Yoneda, Kenichi; Inoue, Yasuyuki; and Atsukawa, Masumi, 4,166,838, Cl. 423-242.000.

Auer, John H., Jr.; and Svet, Frank A., Jr., to General Signal Corporation. Wayside oriented moving block. 4,166,599, Cl. 246-63.00A.

Austin Powder Company: *See*—
Calder, Brooke J., Jr., 4,166,418, Cl. 102-24.00R.

B. F. Goodrich Company, The: *See*—
Begnaud, Edward M.; and Birkmeier, Benedict C., 4,166,569, Cl. 229-23.00C.

Babcock Controls Limited: *See*—
deVial, Raymond M.; and Cowlin, Philip, 4,167,012, Cl. 346-62.000.

Babcock & Wilcox Company, The: *See*—
Walton, Lewis A., 4,166,313, Cl. 29-243.500.

Babko, Alexandr A.: *See*—
Stepantsov, Georgy K.; Bloschitsyn, Jury N.; Babko, Alexandr A.; Kutlin, Ferdinand K.; and Glazunov, Ivan V., 4,166,374, Cl. 72-430.000.
Stepantsov, Georgy K.; Abramov, Valentin S.; Bloschitsyn, Jury N.; Zaripov, Raif R.; Babko, Alexandr A.; Kutlin, Ferdinand K.; Glazunov, Ivan V.; Nilov, Alexei A.; Kuznetsov, Gennady V.; Viter, Petr A.; Pavlov, Alexandr F.; Belonog, Valery M.; Korneev, Vladimir A.; and Zvereva, Emilia L., 4,166,375, Cl. 72-430.000.

Bacon, James L.; Ernst, Larry M.; and Hauptman, William G., to International Business Machines Corporation. Digitally regulated power supply for use in electrostatic transfer reproduction apparatus. 4,166,690, Cl. 355-3.0CH.

Baer, Ralph H.: *See*—
Isaacson, Anson; Morrison, Howard J.; Baer, Ralph H.; Fletchic, Donald K.; and Keller, Albert G., 4,166,621, Cl. 274-1.00R.

Bainard, Dean R.; and Benjamin, Martin E., to Garlock Inc. Thrust washer and combination seal and thrust washer. 4,166,627, Cl. 277-95.000.

Baker, Thomas B.; and Sittner, Edward H., to ACF Industries, Incorporated. Protective elastomeric brake rod sealing boot. 4,166,520, Cl. 188-33.000.

Baker, William E., to Gauges International, Inc. Pressure indicating device. 4,166,396, Cl. 73-706.000.

Baldwin, John J.; and Lumma, William C., Jr., to Merck & Co., Inc. Certain imidazo(1,2a)pyridine derivatives. 4,166,851, Cl. 424-248.550.

Barcus, Edward L.; and Romanzi, Louis J., to Gateway Industries. Seat belt retractor. 4,166,592, Cl. 242-107.40A.

Barger, John J.; and Overby, Clarence W., to Combustion Engineering, Inc. Dual-gas shielding method. 4,166,940, Cl. 219-74.000.

Bariana, Dilbagh S.: *See*—
Jones, Peter H.; Bariana, Dilbagh S.; Fung, Anthony K. L.; Martin, Yvonne C.; Kyncl, Jaroslav; and Lall, Amrit, 4,166,819, Cl. 548-253.000.

Barkan, Philip: *See*—
Imam, Imdad; and Barkan, Philip, 4,166,937, Cl. 200-82.00B.

Barr, Gerald L. Prefabricated door assembly. 4,166,346, Cl. 52-211.000.

Basel, Donald R.: *See*—
Kawolics, Raymond P.; Basel, Donald R.; and Adeboi, Frans L., 4,166,606, Cl. 251-214.000.

BASF Aktiengesellschaft: *See*—
Fried, Michael; Zuern, Ludwig; and Stahnecker, Erhard, 4,166,890, Cl. 521-92.000.

Battaglia, Anthony. Hair curler and stand. 4,166,472, Cl. 132-9.000.

Batz, James E., to Northern Illinois Gas Company. Quantitative measuring system for combustible gas with audible tick rate. 4,166,380, Cl. 73-23.000.

Bauer, Daniel; Leroy, Jules; and Beck, Jean-Paul, to L'Oreal. Method and apparatus for setting hair. 4,166,473, Cl. 132-9.000.

Bayer Aktiengesellschaft: *See*—
Hoffmann, Hellmut; Arlt, Dieter; Hammann, Ingeborg; Homeyer, Bernhard; and Stendel, Wilhelm, 4,166,850, Cl. 424-220.000.
Hohmann, Walter; and Kuhnel, Werner, 4,166,822, Cl. 260-380.000.
Schossler, Willi; Putter, Rolf; and Behre, Horst, 4,166,826, Cl. 260-509.000.
Wehinger, Egbert; Bossert, Friedrich; Meyer, Horst; Heise, Arend; Kazda, Stanislav; Stoepel, Kurt; and Vater, Wulf, 4,166,855, Cl. 424-266.000.
Zlokarnik, Marko; Guth, Hans; and Mann, Theo, 4,166,790, Cl. 210-15.000.

BBC Brown Boveri & Company Limited: *See*—
Bloch, Heinz, 4,166,762, Cl. 176-20.00R.
Youngs, John A., 4,166,446, Cl. 126-438.000.

Beach, Ralph L., Jr.; and Fuson, William R., to International Paper Company. Polygonal paperboard drum. 4,166,567, Cl. 229-23.0BT.

Beatric Foods Co.: *See*—
Soran, Robert L., 4,166,486, Cl. 141-105.000.

Beattie, Douglas W.: *See*—
Marr, Peter W.; Beattie, Douglas W.; and Easton, James D., 4,166,811, Cl. 260-27.00R.

Beauviala, Jean-Pierre, to Societe AATON. Device for displaying figures by a combination of character segments. 4,167,005, Cl. 340-762.000.

Beck, Jean-Paul: *See*—
Bauer, Daniel; Leroy, Jules; and Beck, Jean-Paul, 4,166,473, Cl. 132-9.000.

Becker, Otto A. Light-transmissive, sound and heat insulating building element. 4,166,345, Cl. 52-172.000.

Beecham Group Limited: *See*—
Ferres, Harry; and Harrington, Frank P., 4,166,817, Cl. 260-239.100.
Hunt, Eric, 4,166,904, Cl. 542-427.000.
Luk, Kong; Clayton, John P.; and Rogers, Norman H., 4,166,863, Cl. 424-283.000.

Beezer, Earl F., to Stelron Cam Company. Device for picking up and placing articles on movable conveyors and assembly lines and to an endless construction and to an article pickup and deposit device therefor. 4,166,527, Cl. 198-486.000.

Begnaud, Edward M.; and Birkmeier, Benedict C., to B. F. Goodrich Company, The. Container. 4,166,569, Cl. 229-23.00C.

Behling, Fredric C.: *See*—
Sullivan, Paul J.; Behling, Fredric C.; and Ptaszek, George W., 4,166,630, Cl. 280-87.02R.

Behre, Horst: *See*—
Schossler, Willi; Putter, Rolf; and Behre, Horst, 4,166,826, Cl. 260-509.000.

Beiersdorf Aktiengesellschaft: *See*—
Cohnen, Erich, 4,166,849, Cl. 424-182.000.

Beise, Theodore W.; and Rice, Robert D., to Stewart-Warner Corporation. Paint sprayer safety interlock. 4,166,579, Cl. 239-526.000.

Belden Corporation: *See*—
Lindstrand, Douglas K., 4,166,311, Cl. 29-33.00A.

Bell Telephone Laboratories, Incorporated: *See*—
Berkley, David A.; and Mitchell, Olga M. M., 4,166,924, Cl. 179-1.00P.
Coldren, Larry A., 4,166,987, Cl. 333-109.000.
Congdon, Wayne I.; Mottine, John J.; and Vesperman, William C., 4,166,881, Cl. 428-463.000.
MacPherson, William F.; and McNair, Irving M., Jr., 4,166,931, Cl. 179-35.000.
Patel, Parbhubhai D., 4,167,031, Cl. 361-388.000.
Scagnelli, Henry J., 4,167,032, Cl. 361-415.000.
Schneider, Herbert A., 4,166,971, Cl. 323-4.000.
Sheinbein, Daniel, 4,166,929, Cl. 179-18.0BG.

Belonog, Valery M.: *See*—
Stepantsov, Georgy K.; Abramov, Valentin S.; Bloschitsyn, Jury N.; Zaripov, Raif R.; Babko, Alexandr A.; Kutlin, Ferdinand K.; Glazunov, Ivan V.; Nilov, Alexei A.; Kuznetsov, Gennady V.; Viter, Petr A.; Pavlov, Alexandr F.; Belonog, Valery M.; Korneev, Vladimir A.; and Zvereva, Emilia L., 4,166,375, Cl. 72-430.000.

Bendix Corporation, The: *See*—
Helava, Uuno V.; and Phipps, Jack R., 4,166,440, Cl. 123-117.00R.
Wolber, William G., 4,166,564, Cl. 228-156.000.

Benes, Ewald; and Hammer, Dieter, to List, Hans. Piezoelectric resonator with acoustic reflectors. 4,166,967, Cl. 310-338.000.

Beninca', Marcello; and Lora, Mario, to Rimar Meccanica S.p.A. Suction device for removing liquids from machine-treated textiles. 4,166,368, Cl. 68-20.000.

Benjamin, Martin E.: *See*—
Bainard, Dean R.; and Benjamin, Martin E., 4,166,627, Cl. 277-95.000.

Benzinger, Theodor H. Scanning radiometer apparatus. 4,166,390, Cl. 73-355.00R.

Berger, Peter; Lampic, Milan; Muller, Jorg; and Orths, Kurt, to Verein zur Forderung der Giesserei-Industrie. Method and apparatus for the differential thermal analysis of a molten metal. 4,166,378, Cl. 73-15.00B.

Bergkvist, Lars A. Device for optic, preferably visual determination of a certain plane. 4,166,699, Cl. 356-375.000.

Bergmann, Bruce A.; and Mueller, Kurt A. Sequential function hunting arrows. 4,166,619, Cl. 273-106.50B.

Berkley, David A.; and Mitchell, Olga M. M., to Bell Telephone Laboratories, Incorporated. Removing reverberative echo components in speech signals. 4,166,924, Cl. 179-1.00P.

Bernard, James I.; and Strom, Gerald A., to Schlumberger Technology Corporation. Measuring-while drilling system and method having encoder with feedback compensation. 4,167,000, Cl. 367-84.0LD.

Bernardi, Luigi; Masi, Paolo; Suarato, Antonino; and Arcamone, Federico, to Societa Farmaceutici Italia S.p.A. Anthracycline derivatives, their preparation and use. 4,166,848, Cl. 424-180.000.

Bernardi, Luigi; Elli, Carlo; Falconi, Giovanni; and Bonsignori, Alberto, to Farmitalia Carlo Erba S.p.A. Pyridazinyl-ergoline compounds having neuroleptic activity. 4,166,911, Cl. 544-238.000.

Berns, Reiner: *See—*
Scheel, Wolfgang; Berns, Reiner; and Heinen, Wolfgang, 4,166,754, Cl. 134-24.000.
Bertin & Cie: *See—*
Duthion, Louis; Sagner, Max; and Portier, Claude, 4,166,477, Cl. 137-604.000.
Bertus, Brent J.: *See—*
McKay, Dwight L.; and Bertus, Brent J., 4,166,806, Cl. 252-437.000.
Bessette, Oliver E.; and Griffin, James S., to RCA Corporation. Rotating head recorder with different recording and playback speeds. 4,167,023, Cl. 358-127.000.
Bethlehem Steel Corporation: *See—*
Schenck, Arthur J.; and Krause, Richard H., 4,167,004, Cl. 340-679.000.
Bettcher Industries, Inc.: *See—*
Bettcher, Louis A., 4,166,317, Cl. 30-276.000.
Bettcher, Louis A., to Bettcher Industries, Inc. Trimming knife. 4,166,317, Cl. 30-276.000.
Betz, Norman L.; Lanter, Kent J.; Breuer, Leslie H.; and Steinke, Frederick H., to Ralston Purina Company. Palatability in horse feeds. 4,166,867, Cl. 426-73.000.
Bewley, James G., to Metallurgical International, Inc. Powdered metal filter composition and processes for producing the same. 4,166,736, Cl. 75-0.5BA.
Bianchi, Giuseppe; De Nora, Oronzio; and Spaziante, Placido M., to Oronzio de Nora Impianti Elettrochimici S.p.A. Novel electrolytic process. 4,166,780, Cl. 204-99.000.
Bianchi, Valerio; Latsch, Reinhard; and Schmidt, Peter-Jurgen, to Robert Bosch GmbH. Method and apparatus for controlling the operating parameters of an internal combustion engine. 4,166,437, Cl. 123-32.0EC.
Bifani, Alberto G.: *See—*
Cecchi, Carlo; and Bifani, Alberto G., 4,166,544, Cl. 414-747.000.
Birfield Trasmissioni S.p.A.: *See—*
Stiasny, Carl-Heinz, 4,166,443, Cl. 126-91.00A.
Birkmeier, Benedict C.: *See—*
Begnaud, Edward M.; and Birkmeier, Benedict C., 4,166,569, Cl. 229-23.00C.
Blaha, Gerald E.: *See—*
Gudmestad, Ragnar; and Blaha, Gerald E., 4,166,315, Cl. 29-564.400.
Blanton, William A., Jr.; and Jaffe, Joseph, to Chevron Research Company. Sulfur oxides control in catalytic cracking. 4,166,787, Cl. 208-120.000.
Blasko, Jan: *See—*
Chrtek, Milan; Tuma, Frantisek; Gabler, Josef; Kasparek, Karel; and Blasko, Jan, 4,166,356, Cl. 57-302.000.
Blaydon, Thomas J., to Garlock Inc. Grease purgeable bushing seal. 4,166,628, Cl. 277-152.000.
Blecha, Miroslav; Plichta, Zdenek; Votavova, Eva; and Kalal, Jaroslav, to Ceskoslovenska akademie ved. Polymeric color indicators and a method of their preparation. 4,166,804, Cl. 252-408.000.
Bleiweiss, Edward: *See—*
Schlosser, Paul W., 4,166,410, Cl. 91-50.000.
Blickenstaff, John E., to Calspan Corporation. Fluid bed chaff dispenser. 4,167,008, Cl. 343-18.00E.
Bloch, Heinz, to BBC Brown Boveri & Company Limited. Control apparatus with frequency-dependent control elements and application of the control apparatus to regulating the steam pressure of boiling water reactors. 4,166,762, Cl. 176-20.00R.
Blomberg, Folke I.; and Holst, Jan-Olov M. Brake actuating and relieving structure. 4,166,657, Cl. 303-116.000.
Bloom, Ann. Zippered elastic support for body extremities. 4,166,463, Cl. 128-165.000.
Bloschitsyn, Jury N.: *See—*
Stepantsov, Georgy K.; Bloschitsyn, Jury N.; Babko, Alexandr A.; Kutlin, Ferdinand K.; and Glazunov, Ivan V., 4,166,374, Cl. 72-430.000.
Stepantsov, Georgy K.; Abramov, Valentin S.; Bloschitsyn, Jury N.; Zaripov, Raif R.; Babko, Alexandr A.; Kutlin, Ferdinand K.; Glazunov, Ivan V.; Nilov, Alexei A.; Kuznetsov, Gennady V.; Viter, Petr A.; Pavlov, Alexandr F.; Belonog, Valery M.; Korneev, Vladimir A.; and Zvereva, Emilia I., 4,166,375, Cl. 72-430.000.
Bodas, Janos: *See—*
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Boehringer Ingelheim GmbH: *See—*
Stahle, Helmut; Koppe, Herbert; Kummer, Werner; and Hoefke, Wolfgang, 4,166,859, Cl. 424-273.00R.
Bogardus, Harold F.: *See—*
Thompson, Joseph K.; Clark, Robert C.; Fielding, George H.; and Bogardus, Harold F., 4,166,729, Cl. 55-138.000.
Bohme, Helmut; and Vogel, Gerhard, to Jenoptik Jena G.m.b.H. Gear means for control of planetaria projectors. 4,166,401, Cl. 74-802.000.
Bokros, Jack C., to Carbomedics, Inc. Stress reinforced artificial joint prostheses. 4,166,292, Cl. 3-1.910.
Boland, Robert P.: *See—*
Apostolos, John T.; and Boland, Robert P., 4,166,980, Cl. 325-363.000.
Bolen, Charles E.: *See—*
Marzocchi, Alfred; Roberts, Michael G.; and Bolen, Charles E., 4,166,752, Cl. 106-273.00N.
Bonati, Attilio; and Mustich, Giuseppe, to Inverni della Beffa S.p.A. Pharmacologically active polyphenolic substances. 4,166,861, Cl. 424-278.000.
Bonnaterre, Raymond, to Saft-Societe des Accumulateurs Fixes et de Traction. Nickel-cadmium cell and method for precharging negative electrode of nickel-cadmium alkaline storage cell. 4,166,886, Cl. 429-60.000.
Bonsignori, Alberto: *See—*
Bernardi, Luigi; Elli, Carlo; Falconi, Giovanni; and Bonsignori, Alberto, 4,166,911, Cl. 544-238.000.
Borowski, Karl-Heinz: *See—*
Oberste-Beulmann, Klaus; Schupphaus, Herbert; Borowski, Karl-Heinz; Lanfermann, Willy; and Henrich, Friedhelm, 4,166,652, Cl. 299-43.000.
Bosen, Don B. Tire bead expander. 4,166,493, Cl. 157-1.210.
Bossert, Friedrich: *See—*
Wehinger, Egbert; Bossert, Friedrich; Meyer, Horst; Heise, Arend; Kazda, Stanislav; Stoepel, Kurt; and Vater, Wulf, 4,166,855, Cl. 424-266.000.
Bourcier de Carbon, Christian. Pneumatic spring device. 4,166,522, Cl. 188-287.000.
Bouyoucos, John V.; and DeLaCroix, Robert F., to Hydroacoustics, Inc. Percussive drilling apparatus. 4,166,507, Cl. 173-105.000.
Bowden, James. Packaging articles. 4,166,534, Cl. 206-429.000.
Bowen, Howard; Henderson, Dave; and Little, Steve, to Research Technology, Inc. Film thickness detector. 4,166,700, Cl. 356-381.000.
Bradley, Terry G.: *See—*
Manning, Walter; and Bradley, Terry G., 4,166,400, Cl. 74-552.000.
Bradshaw, Robert F. D., to Pye Limited. Apparatus for the detection of volatile organic substances. 4,166,379, Cl. 73-23.000.
Brady, Jesse J., III, to United States of America, Navy. High resolution phase shifter beamformer for a cylindrical array. 4,166,999, Cl. 367-105.000.
Brakelmann, Heinrich: *See—*
Friedrich, Jurgen; Brakelmann, Heinrich; and Rasquin, Werner, 4,166,920, Cl. 174-15.00C.
Brandon, Ralph E.; Ring, Michael; and Redner, Raymond, III, to International Paper Company. Non-woven fabric lightly fiber-entangled. 4,166,877, Cl. 428-221.000.
Braun Engineering Company: *See—*
Braun, Frederick W., 4,166,373, Cl. 72-356.000.
Braun, Frederick W., to Braun Engineering Company. Method of cold forming. 4,166,373, Cl. 72-356.000.
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Breuer, Bernd: *See—*
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Breuer, Leslie H.: *See—*
Betz, Norman L.; Lanter, Kent J.; Breuer, Leslie H.; and Steinke, Frederick H., 4,166,867, Cl. 426-73.000.
Brewer, Richard J.; and Wooten, Willis C., Jr., to Eastman Kodak Company. Cellulose propionate n-butyrate and coating compositions containing same. 4,166,809, Cl. 260-16.000.
Brienza, Michael J.; Garron, Stephen A.; and Sedlatschek, Robert, to Singer Company, The. Adaptive sewing machine. 4,166,423, Cl. 112-254.000.
Bright, Gene M., to Pfizer Inc. 4''-Deoxy-4''-arylglyoxamido- and aroylthioformamido derivatives of oleandomycin and its esters. 4,166,901, Cl. 536-9.000.
Bristol-Myers Company: *See—*
Menard, Marcel; Lim, Gary M. F.; and Conway, Terry T., 4,166,905, Cl. 544-105.000.
Menard, Marcel; Lim, Gary M. F.; and Conway, Terry T., 4,166,906, Cl. 544-105.000.
British Columbia Telephone Company: *See—*
Hamaoki, Roy T., 4,166,927, Cl. 179-2.0EB.
British Steel Corporation: *See—*
Kewin, James N., 4,166,433, Cl. 122-6.600.
Bron, Dan. Fluid-operated linear actuator. 4,166,411, Cl. 91-337.000.
Brooks, Peter L., to Raychem Corporation. Quarternary $\beta$-brass type alloys capable of being rendered heat recoverable. 4,166,739, Cl. 75-157.500.
Brown, Alfred; Huang, Wann-Sheng; and Shum, Yick-Mow, to Texaco Inc. High vertical conformance steam drive oil recovery method. 4,166,504, Cl. 166-272.000.
Brown, Alfred: *See—*
Hall, Wilbur L.; Brown, Alfred; and Korstad, Ralph J., 4,166,502, Cl. 166-263.000.
Hall, Wilbur L.; Brown, Alfred; and Korstad, Ralph J., 4,166,503, Cl. 166-263.000.
Korstad, Ralph J.; Hall, Wilbur L.; Wu, Ching H.; and Brown, Alfred, 4,166,501, Cl. 166-263.000.
Brown, Donald B.: *See—*
Keizer, Alan S.; and Brown, Donald B., 4,166,562, Cl. 228-5.100.
Bruckenstein, Stanley; and Sherwood, William G., to United States of America, Interior. Electrochemical gas monitoring method. 4,166,775, Cl. 204-1.00T.
Bruckl, Konrad: *See—*
Schausberger, Helmut; Bruckl, Konrad; and Sailer, Gunther, 4,166,689, Cl. 354-321.000.
Bruckner Apparatebau GmbH: *See—*
Bruckner, Kurt; and Schuierer, Manfred, 4,166,561, Cl. 226-105.000.

Bruckner, Kurt; and Schuierer, Manfred, to Bruckner Apparatebau GmbH. Apparatus for treating a web of textile material in a dwell zone. 4,166,561, Cl. 226-105.000.

Brueckner, Karl H.; Farel, Charles A.; and Hu, Paul Y., to International Business Machines Corporation. Symmetrical structure for shunt controlled regulated transformer. 4,166,992, Cl. 336-155.000.

Bruno, Carlo L., to Alisyncro S.a.s. di Bruno & C. Installation for the distribution of food products, particularly confectionery products. 4,166,525, Cl. 198-437.000.

Bryan, John F., Jr. Telescoping lattice boom crane. 4,166,542, Cl. 212-55.000.

Buchholz, Fredric L., to Dow Chemical Company, The. Process for the preparation of endo-6-hydroxybicyclo[2.2.1]heptane-endo-2-methanol and derivatives thereof. 4,166,915, Cl. 568-820.000.

Buckeye Cellulose Corporation, The: *See*—
Oliver, Don W.; and Dale, John L., 4,166,461, Cl. 128-132.00D.

Bullard, Jack R., to American Commercial Lines, Inc. Tightening and securing cables holding barges together. 4,166,427, Cl. 114-251.000.

Bundy, Gordon L., to Upjohn Company, The. 9-Deoxy-9-methylene-inter-phenylene-16-phenyl-PGF compounds. 4,166,912, Cl. 560-61.000.

Burns, Bernard J.: *See*—
Douglas, George H.; Burns, Bernard J.; and Campbell, Henry F., 4,166,860, Cl. 424-273.00R.

Burroughs Corporation: *See*—
Ragle, Herbert U.; and DeMoss, Dean, 4,167,029, Cl. 360-99.000.
Rayfield, Wilson P., 4,166,402, Cl. 74-822.000.

Burroughs Wellcome Co.: *See*—
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Buscher, Enno: *See*—
Rienass, Rainer; Buscher, Enno; and Jansing, Walter, 4,166,714, Cl. 417-50.000.

Bussey, Harry, Jr. Free-flowing packaging material. 4,166,875, Cl. 428-159.000.

Butler, John D.: *See*—
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Buxbaum, Lothar; and Hugi, Rolf, to Ciba-Geigy Corporation. Copolyester from 1,4-butanediol and a dicarboxylic acid mixture. 4,166,895, Cl. 528-272.000.

C.R.O., Inc.: *See*—
Cecil, Shelby, 4,166,941, Cl. 219-124.340.

Calder, Brooke J., Jr., to Austin Powder Company. Time delay primer and method of making same. 4,166,418, Cl. 102-24.00R.

Calgon Corporation: *See*—
Schaper, Raymond J., 4,166,894, Cl. 528-271.000.

California Polytechnic State University Foundation, The: *See*—
Wight, Hewitt G.; Call, Tracey G.; and Mortensen, Martin L., 4,166,866, Cl. 424-300.000.

California Sounds, Ltd.: *See*—
Sandor, Joseph; and Davis, Claude P., 4,166,626, Cl. 274-47.000.

Call, Tracey G.: *See*—
Wight, Hewitt G.; Call, Tracey G.; and Mortensen, Martin L., 4,166,866, Cl. 424-300.000.

Callahan, Joseph: *See*—
Callahan, Joseph T.; and Delp, Charles R., 4,166,376, Cl. 73-1.00F.

Callahan, Joseph T.; and Delp, Charles R., to Callahan, Joseph; and Delp, Charles. Fluidized solids particle discharge device. 4,166,376, Cl. 73-1.00F.

Calspan Corporation: *See*—
Blickenstaff, John E., 4,167,008, Cl. 343-18.00E.

Calton, Gary J.; and Espenshade, Marlin A., to W. R. Grace & Co. Production of monorden. 4,166,764, Cl. 435-119.000.

Campbell, Henry F.: *See*—
Douglas, George H.; Burns, Bernard J.; and Campbell, Henry F., 4,166,860, Cl. 424-273.00R.

Canadeo, Thomas M.: *See*—
Carollo, Glenn M.; and Canadeo, Thomas M., 4,166,324, Cl. 33-241.000.

Canon Kabushiki Kaisha: *See*—
Ito, Fumio; and Yazaki, Mutsunobu, 4,166,683, Cl. 354-192.000.

Carbomedics, Inc.: *See*—
Bokros, Jack C., 4,166,292, Cl. 3-1.910.

Carborundum Company, The: *See*—
Roberts, Robert; and Chapman, Frank M., 4,166,536, Cl. 206-524.300.

Cardio Technology Limited: *See*—
McClelland, Brian, 4,166,453, Cl. 128-639.000.

Cardot, Claude R.; Democrate, Gerard E.; Droux, Jacques P.; Oisel, Andre J.; and Prival, Guy, to Compagnie Internationale pour l'Information Cii Honeywell Bull. Apparatus and method for shifting a head movable relative to a carrier for recorded information. 4,166,970, Cl. 318-561.000.

Carlson, David E., to RCA Corporation. Amorphous silicon solar cell allowing infrared transmission. 4,166,919, Cl. 136-89.0CL.

Carlson, Robert F., to Stretch Wrap, Inc. Tension wrap packaging machine. 4,166,348, Cl. 53-556.000.

Carollo, Glenn M.; and Canadeo, Thomas M. Illuminated sight. 4,166,324, Cl. 33-241.000.

Carranza, William L., to Sunshine Cordage Corporation. Method of making rope. 4,166,357, Cl. 57-310.000.

Carrieri, Louis F.: *See*—
Spanke, Edwin A.; and Carrieri, Louis F., 4,166,415, Cl. 100-53.000.

Carson, Chrislyn M.; Ehr, Robert J.; and Rogers, Richard B., to Dow Chemical Company, The. Substituted 1-pyridinyloxy-1-(imidazolyl)-2-butanone compounds and their use as fungicides. 4,166,854, Cl. 424-263.000.

Cassens, Nicholas, Jr., to Kaiser Aluminum & Chemical Corporation. Plastic chrome ore. 4,166,748, Cl. 106-66.000.

Casson, Edward A., Jr.; Gaul, Albro T.; Langlais, Eugene L.; Shadlen, Gerald; and Vanaver, Eugene L., to Hoechst Aktiengesellschaft. Corrosion resistant metallic plates particularly useful as support members for photo-lithographic plates and the like. 4,166,777, Cl. 204-28.000.

Castelli, Renato. Tidy box made entirely of polypropylene. 4,166,547, Cl. 220-339.000.

Castonguay, Roger N.; and Jencks, Charles L., to General Electric Company. Circuit breaker remote close and charged signalling apparatus. 4,166,989, Cl. 335-17.000.

Caterpillar Tractor Co.: *See*—
Hedgcock, Richard L.; and Ritter, Arthur J., Jr., 4,166,661, Cl. 308-207.00R.
Stedman, Robert N., 4,166,511, Cl. 180-9.500.
Thompson, LeRoy R.; and Meints, Edward G., 4,166,878, Cl. 428-256.000.

Caves, Francis J.: *See*—
Hall, Samuel S.; and Caves, Francis J., 4,166,605, Cl. 251-129.000.

Cecchi, Carlo; and Bifani, Alberto G., to Fiat-Allis Macchine Movimento Terra S.p.A. Pipe-laying machine for oil pipelines, conduits and the like. 4,166,544, Cl. 414-747.000.

Cecil, Shelby, to C.R.O., Inc. Guidance system for arc welder. 4,166,941, Cl. 219-124.340.

Cerberus AG: *See*—
Keller, Hansjurg, 4,166,955, Cl. 250-342.000.
Meili, Ernst, 4,166,960, Cl. 250-574.000.

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Chapman, John D., to Fisons Limited. Process for producing ammonium phosphate from ammonia and wet process phosphoric acid. 4,166,840, Cl. 423-313.000.

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Sakamoto, Koji; Asano, Takeshi; Mizuochi, Kazuo; Sasaki, Kanemichi; and Hasegawa, Kouji, 4,166,865, Cl. 424-285.000.

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Cohnen, Erich, to Beiersdorf Aktiengesellschaft. Peruvoside derivatives and processes for their preparation. 4,166,849, Cl. 424-182.000.
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Colby, Bruce N.; and Hull, Charles W., to Du Pont de Nemours, E. I., and Company. Method and apparatus for the elemental analysis of solids. 4,166,952, Cl. 250-288.000.
Colby, Thomas H.; Freitas, Ernest R.; and Durland, William R., to Shell Oil Company. Process for preparation of a substituted triazine. 4,166,909, Cl. 544-204.000.
Coldren, Larry A., to Bell Telephone Laboratories, Incorporated. Surface acoustic wave multistrip coupler. 4,166,987, Cl. 333-109.000.
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Collins, David A.; and Lile, Derek L., to United States of America, Navy. Method of anodically leveling semiconductor layers. 4,166,782, Cl. 204-129.300.
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Menard, Marcel; Lim, Gary M. F.; and Conway, Terry T., 4,166,906, Cl. 544-105.000.
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Cutchaw, John M. Liquid cooled connector for large scale integrated circuit packages. 4,166,665, Cl. 339-112.00L.
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Dannehl, Gunther, to Kraftwerk Union Aktiengesellschaft. Test head holder in a test system carrier, preferably for ultrasonic test heads. 4,166,395, Cl. 73-634.000.
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de Freminville, Jean-Claude; and Horblin, Michel, to Societe Anonyme Automobiles Citroen. Devices for controlling a speed restriction for vehicles, particularly motor vehicles. 4,166,514, Cl. 180-167.000.
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de Jesus, Angel. Field game. 4,166,617, Cl. 273-95.00H.
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Delp, Charles R.: *See—*
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Depas, Laddie A., Sr., to Miller, Maurice L.; and Thomas, Harold W., part interest to each. Fluid operated modulating valve. 4,166,656, Cl. 303-115.000.
Depew, Walter L. Heat storage vault. 4,166,449, Cl. 126-400.000.
De Prado, Alfred. Adjustable dolly. 4,166,638, Cl. 280-638.000.
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Donovan, John E., to Package Exhibit Programs, Inc. Portable display apparatus. 4,166,332, Cl. 40-605.000.
Dorfeld, William G.; and Ortabasi, Ugur, to Corning Glass Works. Concentrating solar receiver. 4,166,917, Cl. 136-89.0CA.
Douglas, George H.; Burns, Bernard J.; and Campbell, Henry F., to William H. Rorer, Inc. Imidazole amidinoureas for stimulating $H_2$-receptors. 4,166,860, Cl. 424-273.00R.
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D'Silva, Themistocles D. J., to Union Carbide Corporation. Pesticidal unsymmetrical bis-arylcarbamate disulfide compounds. 4,166,864, Cl. 424-285.000.
Duba, Fernand, to Societe Alsacienne de Constructions Mecaniques de Mulhouse. Freed-fiber spinning devices. 4,166,354, Cl. 57-58.890.
Dukess, Joseph. Solar heat apparatus. 4,166,769, Cl. 202-234.000.
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Webster, Donald A., 4,166,573, Cl. 233-26.000.
Woo, Lecon, 4,166,381, Cl. 73-54.000.
Duraiswamy, Kandaswamy; and Winter, Bruce L., to Occidental Petroleum Corporation. Pyrolysis and hydrogenation process. 4,166,786, Cl. 208-8.00R.
Durand, Pierre, to Compagnie Generale des Etablissements Michelin. Process for the production of electric current in an electrochemical generator having an anodic electron collector comprising a passivating layer. 4,166,885, Cl. 429-15.000.
Durant, Graham J.; Ganellin, Charon R.; Owen, Geoffrey R.; and Young, Rodney C., to Smith Kline & French Laboratories Limited. Thiazole and isothiazole derivative as blockers of histamine $H_2$-receptors. 4,166,856, Cl. 424-270.000.
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Duthion, Louis; Sagner, Max; and Portier, Claude, to Bertin & Cie; and Stein Industrie. Discharge conduits of steam generators and the like. 4,166,477, Cl. 137-604.000.
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Electrohome Limited: *See—*
Glass, Kenneth H. B., 4,166,658, Cl. 308-15.000.
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Elliott, Stanley B. Visual-type hygrometer. 4,166,891, Cl. 525-329.000.
Ellis, James M. Self-propelled shark-proof cage. 4,166,462, Cl. 128-145.00R.
Elwell, Stephen J., to Plessey Handel und Investments AG. Liquid injection device. 4,166,577, Cl. 239-102.000.
Emblem, Harold G.; and Das, Anup K., to Zirconal Processes Limited. Binding of refractory materials. 4,166,753, Cl. 106-308.00Q.
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Falcon-Steward, Hugh R., 4,166,582, Cl. 241-16.000.
English, Ralph M. Automobile parking system. 4,166,546, Cl. 414-263.000.
Engstrom, Donald G. Truck-trailer calculator. 4,166,318, Cl. 33-1.00G.

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Salomon, Georges P. J., 4,166,635, Cl. 280-625.000.
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Farnworth, Cecil. Automatic water/sewer sampler. 4,166,392, Cl. 73-425.40R.
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Farris, Darrel D.; and Riggi, Dan. Closed liquid transfer system. 4,166,481, Cl. 141-1.000.
Faulstich, George W., to Three Sisters Ranch Enterprises. Plastic cap and container construction. 4,166,552, Cl. 215-256.000.
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Ferres, Harry; and Harrington, Frank P., to Beecham Group Limited. Penicillins. 4,166,817, Cl. 260-239.100.
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Chapman, John D., 4,166,840, Cl. 423-313.000.
Fister, Julius C., Jr.; and Breedis, John F., to Swiss Aluminium Ltd. Aluminum alloy capacitor foil and method of making. 4,166,755, Cl. 148-2.000.
Flament, Ivon, to Firmenich, S.A. Use of certain acyl-pyrimidines as flavouring agents. 4,166,869, Cl. 426-537.000.
Flanagan, Joseph E., to Rockwell International Corporation. High yield solid propellant hydrogen generators. 4,166,843, Cl. 423-648.00R.
Fleming, Garold L.; and Yatcilla, George, to Hesston Corporation. Crop-loading-responsive fluid supply circuit in bale density control system. 4,166,414, Cl. 100-43.000.
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Isaacson, Anson; Morrison, Howard J.; Baer, Ralph H.; Fletchic, Donald K.; and Keller, Albert G., 4,166,621, Cl. 274-1.00R.
Flick, Kenneth R. Hand snow plow. 4,166,330, Cl. 37-53.000.
Flynn, Francis X. Paint brush. 4,166,304, Cl. 15-191.00R.
Foley, Newman C., to N. B. F. Company, Inc. Low fuel indicating device. 4,167,002, Cl. 340-59.000.
Fong, Jones W., to Sandoz, Inc. Processes for preparation of microspheres. 4,166,800, Cl. 252-316.000.
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Manning, Walter; and Bradley, Terry G., 4,166,400, Cl. 74-552.000.
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Fortunato, Samuel F. Waterproof pill container. 4,166,537, Cl. 206-535.000.
Fowler, T. Kenneth; and Condit, William C., to United States of America, Energy. Plasma confinement apparatus using solenoidal and mirror coils. 4,166,760, Cl. 176-3.000.
Fraleux, Jean, to Thomson-CSF. Device for detecting the deflection signal of the electron beam generated by an electron-gun in an oscilloscope. 4,166,956, Cl. 250-370.000.
Frank, Hermann: *See—*
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Fraterrigo, Salvatore G. Disposable dispensing-proportioning container for semi-fluid pasty products in general, and cosmetics products in particular. 4,166,553, Cl. 222-181.000.
Freeman, John D.; Earls, David E.; and Cielaszyk, Edward F., to General Time Corporation. Intruder alarm. 4,166,428, Cl. 116-86.000.
Freitag, Herbert; and Schnitzius, Klaus, to Stabilus GmbH. Gas spring with means for impeding piston movement away from one terminal position. 4,166,612, Cl. 267-65.00R.
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Fried, Michael; Zuern, Ludwig; and Stahnecker, Erhard, to BASF Aktiengesellschaft. Manufacture of crosslinked foamable moldings from olefin polymers. 4,166,890, Cl. 521-92.000.
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Fromme, Richard H., to Hanna, Daniel C. Dry wiping system for automobiles. 4,166,303, Cl. 15-97.00A.
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Fujie, Kunio; Nakayama, Wataru; Daikoku, Takahiro; Hirasawa, Shigeki; and Kakizaki, Kimio, to Hitachi, Ltd.; and Hitachi Cable, Ltd. Vapor-condensing, heat-transfer wall. 4,166,498, Cl. 165-133.000.
Fujii, Katsuhiko; Nakano, Hitoshi; and Mitsui, Tetsuro, to Honda Giken Kogyo Kabushiki Kaisha. Hydraulic shock absorber for vehicles. 4,166,523, Cl. 188-322.000.
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Funatsu, Chuhei; and Hirata, Toshikiyo, to Toyo Tsushinki Kabushiki Kaisha. Collision avoidance system of aircraft. 4,167,006, Cl. 343-6.5LC.
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Gallacher, Lawrence V.; and Rydzik, Rachelle M., to King Industries, Inc. Solvent-extraction process for recovery and separation of metal values. 4,166,837, Cl. 423-24.000.
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Geissler, Bernhard H.; and Hann, Paul D., to Phillips Petroleum Company. Pinned shaft and carbon black pelleter. 4,166,722, Cl. 23-314.000.
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Ashley, Eugene; and Cozzy, Thomas W., 4,166,407, Cl. 89-12.000.
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George, Clifford L.: *See*—
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Germer, Warren R.; and Palmer, Ansell W., to General Electric Company. Multiple rate electrical energy metering system and method. 4,166,975, Cl. 324-116.000.
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Gevers, Georges A., to Fabrique Nationale Herstal en abrege FN. Sporting weapon. 4,166,409, Cl. 89-128.000.
Geyer, Robert P.; Veasman, Kenneth F.; and Veeraraghavan, Vilakkudi G., to Standard Car Truck Co. Railroad car friction casting metallurgy. 4,166,756, Cl. 148-35.000.
Giacobbe, Frederick, to Chemetron Corporation. Apparatus formation of gaseous mixtures and method of use. 4,166,799, Cl. 252-182.000.
Gilbert, Alan R., to ITT Industries, Inc. Optical fiber connector. 4,166,672, Cl. 350-96.200.
Giletti, Emilio. Chassis for off-the-road vehicles. 4,166,512, Cl. 180-9.640.
Gilliam, Kenneth D.; and Paschke, Edward E., to Standard Oil Company (Indiana). Diisocyanate-modified polyesters as hot melt adhesives and coatings. 4,166,873, Cl. 428-35.000.
Gilling, Donald A., to American Can Company. Package structure. 4,166,535, Cl. 206-470.000.
Gilmore, Ralph W. Stepping switch controlled traffic signal devices. 4,167,001, Cl. 340-43.000.
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Glass, Kenneth H. B., to Electrohome Limited. Spherical bearing assembly with snap-in swivel contact capability. 4,166,658, Cl. 308-15.000.
Glauert, Wolfram; and Klinger, Helmut, to Robert Bosch GmbH. Rotary speed and angular position determination system, particularly for the crankshaft of an internal combustion engine. 4,166,977, Cl. 324-173.000.
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Gleason, John G.; Holden, Kenneth G.; and Huffman, William F., to SmithKline Corporation. Methods and intermediates for preparing cis-4-oxoazetidine intermediates. 4,166,816, Cl. 260-239.00A.
Gleichman, Robert F., to General Electric Company. Thrust bearing assembly. 4,166,659, Cl. 308-175.000.
Golan, Hanan. Modified engine controlling system. 4,166,439, Cl. 123-117.00R.
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Goranson, Rex W., to II-VI Incorporated. Instrument for determining infrared beam vergence. 4,166,954, Cl. 250-338.000.
Gottschalk, Eldon W. Machine with reciprocating pistons and rotating piston carrier. 4,166,438, Cl. 123-43.00R.
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Griffin, John A.; and Griffin, Ivon D. Prosthesis pad retainer means for a brassiere or other breast garment. 4,166,471, Cl. 128-478.000.
Griffin, Wendell L., to GTE Sylvania, Incorporated. Circuit board connector. 4,166,667, Cl. 339-176.0MP.
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Grigsby, Gilbert R. Compressed air-actuated fluid injection apparatus. 4,166,441, Cl. 123-180.00R.
Gross, Friedbert. Cable and method and device for producing same. 4,166,355, Cl. 57-212.000.
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Gustafsson, Berth U., to Projectus Industriprodukter Aktiebolag. Device for washing machine parts. 4,166,305, Cl. 15-302.000.
Guth, Eugene D.; Daly, LeGrand A.; and Arand, John K. Diacritic cracking of hydrocarbon feeds for selective production of ethylene and synthesis gas. 4,166,830, Cl. 252-373.000.
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Hahn, Kurt L.; and Allen, Robert J., to American Can Company. Press apparatus and method utilizing same. 4,166,424, Cl. 113-114.0BE.
Hall, Ernest M., Jr.: *See*—
Walker, Garland H.; and Hall, Ernest M., Jr., 4,166,663, Cl. 339-49.00B.
Hall, Samuel S.; and Caves, Francis J., to Plessey Handel und Investments AG. Device for metering liquids. 4,166,605, Cl. 251-129.000.
Hall, Wilbur L.; Brown, Alfred; and Korstad, Ralph J., to Texaco Inc. High vertical conformance steam drive oil recovery method. 4,166,502, Cl. 166-263.000.
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Korstad, Ralph J.; Hall, Wilbur L.; Wu, Ching H.; and Brown, Alfred, 4,166,501, Cl. 166-263.000.
Hamaoki, Roy T., to British Columbia Telephone Company. Apparatus and method for frequency channel selection in a radiotelephone system. 4,166,927, Cl. 179-2.0EB.
Hamilton, Gordon A., to Champion International Corporation. Carton with integral retractable spout. 4,166,566, Cl. 229-17.00R.
Hamilton, James C. Shoe repair device. 4,166,328, Cl. 36-72.00R.
Hamisch, Hansjoachim, to Robert Bosch GmbH. System for recording or reproduction of signals by means of polarized light beams. 4,167,024, Cl. 358-128.000.
Hamisch, Paul H., Jr., to Monarch Marking Systems, Inc. Hand-held labeler. 4,166,757, Cl. 156-384.000.
Hamlin, Thomas J.; and George, Clifford L., to Xerox Corporation. Jogging and normal force for sheet feeding. 4,166,614, Cl. 271-3.100.
Hammann, Ingeborg: *See*—
Hoffmann, Hellmut; Arlt, Dieter; Hammann, Ingeborg; Homeyer, Bernhard; and Stendel, Wilhelm, 4,166,850, Cl. 424-220.000.
Hammer, Dieter: *See*—
Benes, Ewald; and Hammer, Dieter, 4,166,967, Cl. 310-338.000.
Hanak, Joseph J., to RCA Corporation. Cermet layer for amorphous silicon solar cells. 4,167,015, Cl. 357-16.000.
Hanak, Joseph J.: *See*—
Nostrand, Gerald E.; and Hanak, Joseph J., 4,166,918, Cl. 136-89.00R.
Haner, Lambert, to Acme-Cleveland Development Company. Solenoid. 4,166,991, Cl. 335-261.000.
Hann, Paul D.: *See*—
Geissler, Bernhard H.; and Hann, Paul D., 4,166,722, Cl. 23-314.000.
Hanna, Daniel C.: *See*—
Fromme, Richard H., 4,166,303, Cl. 15-97.00A.
Hansen, Kenneth R.; and Grand, Paul S., to Colgate-Palmolive Company. Antidandruff shampoo compositions containing an aminopolyureylene resin. 4,166,845, Cl. 424-78.000.
Harigane, Kotaro; Kato, Akihiro; and Fujita, Kenji, to Tokyo Denki Kagaku Kogyo Kabushiki Kaisha. Apparatus for re-forming an axial lead of an electronic component into U-shape and affixing said component to elongated support tape. 4,166,312, Cl. 29-38.00C.
Harle, Oliver L., to Chevron Research Company. Diesel fuel containing polyalkylene amine and Mannich base. 4,166,726, Cl. 44-73.000.
Harrigan, Roy M. External cardiac resuscitation aid. 4,166,458, Cl. 128-24.00R.
Harrington, Frank P.: *See*—
Ferres, Harry; and Harrington, Frank P., 4,166,817, Cl. 260-239.100.
Harrison, Richard J., to Safe-T-Lawn, Inc. Lock valve for sprinkler. 4,166,576, Cl. 239-11.000.
Hasegawa, Kouji: *See*—
Sakamoto, Koji; Asano, Takeshi; Mizuochi, Kazuo; Sasaki, Kanemichi; and Hasegawa, Kouji, 4,166,865, Cl. 424-285.000.
Haselbarth, Heinz, to GAF Corporation. X-ray film cassette. 4,166,958, Cl. 250-480.000.
Hashimoto, Akihiko, to Olympus Optical Co., Ltd. Bladed shutter for camera with focal plane shutter. 4,166,685, Cl. 354-231.000.
Hashimoto, Hiroyoshi, to Sanyo Electric Co., Ltd. Stabilizing circuit for phase locked loop. 4,167,027, Cl. 360-37.000.
Haskell, Donald M.; Houser, Clarence G.; and Sherk, Fred T., to Phillip Petroleum Company. Butadiene recovery. 4,166,771, Cl. 203-58.000.
Hauptman, William G.: *See*—
Bacon, James L.; Ernst, Larry M.; and Hauptman, William G., 4,166,690, Cl. 355-3.0CH.
Hauschke, Manfred; and Meissner, Volker. Expander having automatic stepping feature. 4,166,371, Cl. 72-122.000.
Hayashi, Kuniaki; and Tomoyasu, Takatoshi, to Kobe Steel, Ltd. Gas-shielded-type coated arc welding electrode. 4,166,879, Cl. 428-385.000.
Haynie, Louis D. Apparatus for endotracheal and esophageal intubation. 4,166,468, Cl. 128-351.000.
Hedgcock, Richard L.; and Ritter, Arthur J., Jr., to Caterpillar Tractor Co. Bearing retainer. 4,166,661, Cl. 308-207.00R.
Heenan Environmental Systems Ltd.: *See*—
Stribling, John B., 4,166,421, Cl. 110-187.000.
Hege, Paul H. Continuous automatic weighing conveyor for flowable solids. 4,166,510, Cl. 177-16.000.
Heidt, Alfred, to Frankl & Kirchner GmbH & Co. KG. Protective circuit for an electronic switching amplifier in series with an electromagnet. 4,167,030, Cl. 361-154.000.
Heimsch, Robert A.; and Johnson, John H., to Monsanto Company. Preparation of refined olefin/maleic acid copolymers. 4,166,900, Cl. 528-491.000.
Heine, Helmut A.; and Rosenbusch, Helmut, to Propper Manufacturing Co., Inc.; and Heine Optotechnik GmbH & Co. KG. Illumination system for indirect ophthalmoscope. 4,166,677, Cl. 351-16.000.
Heine Optotechnik GmbH & Co. KG: *See*—
Heine, Helmut A.; and Rosenbusch, Helmut, 4,166,677, Cl. 351-16.000.
Heinen, Wolfgang: *See*—
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Heise, Arend: *See*—
Wehinger, Egbert; Bossert, Friedrich; Meyer, Horst; Heise, Arend; Kazda, Stanislav; Stoepel, Kurt; and Vater, Wulf, 4,166,855, Cl. 424-266.000.
Helava, Uuno V.; and Phipps, Jack R., to Bendix Corporation, The. Engine control system utilizing torque converter slip. 4,166,440, Cl. 123-117.00R.
Heller, Laszlo; Forgo, Laszlo; Papp, Istvan; Bodas, Janos; Agejev, Georgij S.; Alekszejev, Ivan A.; and Minaszjan, Ruben G. Greenhouse with heating and ventilating means. 4,166,339, Cl. 47-17.000.
Henderson, Chuck A. Pilot's power elevator. 4,166,517, Cl. 187-6.000.
Henderson, Dave: *See*—
Bowen, Howard; Henderson, Dave; and Little, Steve, 4,166,700, Cl. 356-381.000.
Henderson, Henning M.; and Weakley, Burton, to Computer Driver Control Holdings (Proprietary) Limited. Protection of internal combustion engines and/or vehicles embodying the same. 4,166,442, Cl. 123-198.00D.
Henderson, William A., Jr., to American Cyanamid Company. Chiral rhodium-diphosphine catalyst capable of catalytic reduction of a tetramisole precursor to give a significant excess of the desired S-(−)isomer, levamisole. 4,166,824, Cl. 260-429.00R.
Hennessy, James W., to Hycel, Inc. Calculated parameter generation in a hematology parameter measurement apparatus. 4,167,038, Cl. 364-416.000.
Henrich, Friedhelm: *See*—
Oberste-Beulmann, Klaus; Schupphaus, Herbert; Borowski, Karl-Heinz; Lanfermann, Willy; and Henrich, Friedhelm, 4,166,652, Cl. 299-43.000.
Henson, Kenneth, to Unigate Limited. Manufacture of electrodes for electrochemical cells. 4,166,870, Cl. 427-122.000.
Herbig, Charles A. Adjustable arch support for shoes. 4,166,329, Cl. 36-97.000.
Heritier, Francis R.; and Iles, Christopher W., to Plessey Handel und Investments AG. Taximeter indicating devices. 4,167,040, Cl. 364-900.000.
Herrmann, Henry O., Jr., to AMP Incorporated. High voltage quick disconnect electrical connector assembly. 4,166,664, Cl. 339-91.00R.
Hesston Corporation: *See*—
Fleming, Garold L.; and Yatcilla, George, 4,166,414, Cl. 100-43.000.
Garrison, Harold K.; and Pruitt, Martin E., 4,166,353, Cl. 56-377.000.

Hetrick, Vernon L., to Meyer Products, Inc. Spreader for particulate material. 4,166,581, Cl. 239-683.000.

Higley, David P.; Culp, Gary L.; Crandall, John W.; and Farquhar, Scott M., to Union Carbide Corporation. Continuous process for separating high boiling, heat sensitive materials. 4,166,773, Cl. 203-72.000.

Hill, David W.; and Pike, Edward R., to National Research Development Corporation. Method and apparatus for measuring retinal blood flow. 4,166,695, Cl. 356-28.000.

Hirano, Akira. Rulers for making axonometric projection drawings. 4,166,322, Cl. 33-432.000.

Hirasawa, Shigeki: *See—*
Fujie, Kunio; Nakayama, Wataru; Daikoku, Takahiro; Hirasawa, Shigeki; and Kakizaki, Kimio, 4,166,498, Cl. 165-133.000.

Hirata, Toshikiyo: *See—*
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Hirata, Tositaka: *See—*
Ebi, Yutaka; Hirata, Tositaka; Kato, Toshifumi; and Ikezu, Yohei, 4,166,691, Cl. 355-11.000.

Hitachi Cable, Ltd.: *See—*
Fujie, Kunio; Nakayama, Wataru; Daikoku, Takahiro; Hirasawa, Shigeki; and Kakizaki, Kimio, 4,166,498, Cl. 165-133.000.

Hitachi, Ltd.: *See—*
Fujie, Kunio; Nakayama, Wataru; Daikoku, Takahiro; Hirasawa, Shigeki; and Kakizaki, Kimio, 4,166,498, Cl. 165-133.000.
Ienaka, Masanori, 4,166,925, Cl. 179-1.0GM.
Inoyama, Tadao; Aomori, Kokichi; and Terai, Hidekazu, 4,166,945, Cl. 235-379.000.
Ito, Masaru; Murayama, Seiichi; Yamamoto, Manabu; and Ohishi, Kounosuke, 4,166,697, Cl. 356-319.000.
Matsuda, Yasumasa; Yamada, Kazuji; Shimada, Satoshi; Nishihara, Motohisa; Yasuda, Tomio; Tsuchiya, Masatoshi; Soeno, Ko; Ai, Mitsuo; Nagata, Takeo; and Matsuoka, Yoshitaka, 4,166,384, Cl. 73-141.00A.
Nakazato, Masao; Yuminaka, Takeo; and Yoneda, Kenji, 4,166,518, Cl. 187-29.00R.
Ohba, Kenichi; and Narita, Kazutaka, 4,167,018, Cl. 357-51.000.

Hiyoshi, Teruo; Nakada, Akira; Yamada, Shigeru; Ichikawa, Kiyoshi; and Isii, Sigeki, to Nippon Gakki Seizo Kabushiki Kaisha. Electronic musical instrument. 4,166,405, Cl. 84-1.240.

Hoeberechts, Arthur M. E., to U.S. Philips Corporation. Target and target assembly for a camera tube and method of manufacturing same. 4,166,969, Cl. 313-371.000.

Hoechst Aktiengesellschaft: *See—*
Casson, Edward A., Jr.; Gaul, Albro T.; Langlais, Eugene L.; Shadlen, Gerald; and Vanaver, Eugene L., 4,166,777, Cl. 204-28.000.
Dam, Naim G.; and Hufnagel, John P., 4,166,961, Cl. 250-573.000.
Degenhardt, Karl-Heinz; Frank, Hermann; and Marx, Gerhard, 4,166,728, Cl. 55-51.000.
Dennhardt, Werner, 4,166,590, Cl. 242-75.510.
Wortmann, Joachim; Dany, Franz-Josef; and Kandler, Joachim, 4,166,743, Cl. 252-8.100.

Hoefke, Wolfgang: *See—*
Stahle, Helmut; Koppe, Herbert; Kummer, Werner; and Hoefke, Wolfgang, 4,166,859, Cl. 424-273.00R.

Hoffmann, Hellmut; Arlt, Dieter; Hammann, Ingeborg; Homeyer, Bernhard; and Stendel, Wilhelm, to Bayer Aktiengesellschaft. Combating pests with N-acetyl-0-(2-chloro-1-fluoro-ethyl)-thionophosphoric (phosphonic) acid ester-amides. 4,166,850, Cl. 424-220.000.

Hofmeister, Rainer: *See—*
Menke, Josef F.; and Hofmeister, Rainer, 4,166,953, Cl. 250-333.000.

Hohmann, Walter; and Kuhnel, Werner, to Bayer Aktiengesellschaft. Branched-chain alkyl amino anthraquinones. 4,166,822, Cl. 260-380.000.

Hoke, Inc.: *See—*
Webb, Maurice J., 4,166,607, Cl. 251-335.00B.

Holden, Kenneth G.: *See—*
Gleason, John G.; Holden, Kenneth G.; and Huffman, William F., 4,166,816, Cl. 260-239.00A.

Holmes, Curtis F.: *See—*
Mueller, Max A.; McLean, Robert L.; Holmes, Curtis F.; and Greatbatch, Wilson, 4,166,887, Cl. 429-191.000.

Holmes, David D., to RCA Corporation. Suppression of luminance signal contamination of chrominance signals in a video signal processing system. 4,167,020, Cl. 358-36.000.

Holmes, David D., to RCA Corporation. Suppression of chrominance signal contamination of the luminance signal in a video signal processing system. 4,167,021, Cl. 358-36.000.

Holst, Jan-Olov M.: *See—*
Blomberg, Folke I.; and Holst, Jan-Olov M., 4,166,657, Cl. 303-116.000.

Holzle, Gerd: *See—*
Reinert, Gerhard; Holzle, Gerd; and Pugin, Andre, 4,166,718, Cl. 8-111.000.

Homburg, Helmut: *See—*
Coenenberg, Hans-Helmut; Homburg, Helmut; and Ziems, Horst, 4,166,349, Cl. 56-10.200.

Homeyer, Bernhard: *See—*
Hoffmann, Hellmut; Arlt, Dieter; Hammann, Ingeborg; Homeyer, Bernhard; and Stendel, Wilhelm, 4,166,850, Cl. 424-220.000.

Honda Giken Kogyo Kabushiki Kaisha: *See—*
Fujii, Katsuhiko; Nakano, Hitoshi; and Mitsui, Tetsuro, 4,166,523, Cl. 188-322.000.
Okada, Motohiro; and Ohmori, Taiji, 4,166,641, Cl. 280-735.000.
Okunishi, Hiromu; Nakaji, Hideki; Suwa, Hiroyuki; and Sato, Hideaki, 4,166,521, Cl. 188-251.00M.

Hoover, Lawrence E.; and Reid, George J., to Reid, George J. Portable wrapping film dispenser. 4,166,589, Cl. 242-75.400.

Horblin, Michel: *See—*
de Freminville, Jean-Claude; and Horblin, Michel, 4,166,514, Cl. 180-167.000.

Horning, John E.; Radzai, Roy R.; and Hagstrom, John R., to United States of America, Navy. Method for optically distorting readout reticles. 4,166,694, Cl. 355-77.000.

Horsman Dolls Inc.: *See—*
Kosicki, Witold W.; Corris, Charles J.; and Potter, Robert T., 4,166,337, Cl. 46-232.000.

Hoshimi, Susumu: *See—*
Mori, Yoshihisa; Tamura, Shingo; Hoshimi, Susumu; and Yasuda, Shiro, 4,166,624, Cl. 274-9.00C.

Hoskins, Phillip K.; and Johnson, Harmon W., to International Business Machines Corporation. Circuitry for perfecting ink drop printing at nonlinear carrier velocity. 4,167,013, Cl. 346-75.000.

Houdaille Industries, Inc.: *See—*
DiDonato, Joseph S., Jr.; and Kwiecinski, Timothy J., 4,166,403, Cl. 83-13.000.

Houser, Clarence G.: *See—*
Haskell, Donald M.; Houser, Clarence G.; and Sherk, Fred T., 4,166,771, Cl. 203-58.000.

Hovermarine Transport Limited: *See—*
Tattersall, Edward G., 4,166,515, Cl. 180-119.000.

Howe, Robert K., to Monsanto Company. Oxadiazol-5-yl-benzoates. 4,166,732, Cl. 71-92.000.

Howmedica Inc.: *See—*
Findl, Eugene; and Kurtz, Robert J., 4,166,455, Cl. 128-691.000.

Hu, Paul Y.: *See—*
Brueckner, Karl H.; Farel, Charles A.; and Hu, Paul Y., 4,166,992, Cl. 336-155.000.

Huang, Wann-Sheng: *See—*
Brown, Alfred; Huang, Wann-Sheng; and Shum, Yick-Mow, 4,166,504, Cl. 166-272.000.

Huckaby, Leonard L. Oil well pumping tube drain device. 4,166,715, Cl. 417-434.000.

Huffman, William F.: *See—*
Gleason, John G.; Holden, Kenneth G.; and Huffman, William F., 4,166,816, Cl. 260-239.00A.

Hufnagel, John P.: *See—*
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Hughes Aircraft Company: *See—*
Domokos, Julius, 4,166,359, Cl. 58-23.0BA.

Hugi, Rolf: *See—*
Buxbaum, Lothar; and Hugi, Rolf, 4,166,895, Cl. 528-272.000.

Hugin Kassaregister Aktiebolag: *See—*
Pold, Jaan; and Wettersten, Karl-Bertil W., 4,166,949, Cl. 250-223.00B.

Hull, Charles W.: *See—*
Colby, Bruce N.; and Hull, Charles W., 4,166,952, Cl. 250-288.000.

Hultgren, Eric A.: *See—*
Zawacki, John S., Jr.; and Hultgren, Eric A., 4,166,707, Cl. 401-68.000.

Hundstad, Richard L.; and Wutzke, Steve A., to Westinghouse Electric Corp. Ballast technique for laser cathode pins. 4,166,986, Cl. 331-94.5PE.

Hung, Roland Y.; and Shih, Kwang K., to International Business Machines Corporation. Optically isolated monolithic light emitting diode array. 4,167,016, Cl. 357-17.000.

Hunt, Eric, to Beecham Group Limited. Beta-lactam containing compounds. 4,166,904, Cl. 542-427.000.

Hustler, Inc.: *See—*
Altmayer, John, 4,167,011, Cl. 343-749.000.

Hutchinson, Richard D., Jr.: *See—*
Vandenbrink, Wayne; Stegenga, Philip D.; and Hutchinson, Richard D., Jr., 4,166,651, Cl. 296-84.00B.

Hycel, Inc.: *See—*
Hennessy, James W., 4,167,038, Cl. 364-416.000.

Hydragon Corporation: *See—*
Earnest, Ernest R.; and Passinos, Bill, 4,166,361, Cl. 60-39.18R.

Hydroacoustics, Inc.: *See—*
Bouyoucos, John V.; and DeLaCroix, Robert F., 4,166,507, Cl. 173-105.000.

Ichikawa, Kiyoshi: *See—*
Hiyoshi, Teruo; Nakada, Akira; Yamada, Shigeru; Ichikawa, Kiyoshi; and Isii, Sigeki, 4,166,405, Cl. 84-1.240.

Ichimura, Takeo: *See—*
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Idec, Eric J.: *See—*
McArdle, James M.; Idec, Eric J.; and Marshall, Francis G., 4,166,474, Cl. 132-88.700.

Idelson, Elbert M., to Polaroid Corporation. Yellow azomethine dye developers. 4,166,741, Cl. 96-77.000.

Idemitsu Kosan Co., Ltd.: *See—*
Komeiji, Azuma; and Murakami, Nobuo, 4,166,751, Cl. 106-112.000.

Ienaka, Masanori, to Hitachi, Ltd. FM stereo demodulator. 4,166,925, Cl. 179-1.0GM.

II-VI Incorporated: *See—*
Goranson, Rex W., 4,166,954, Cl. 250-338.000.

Ikezu, Yohei: *See—*
Ebi, Yutaka; Hirata, Tositaka; Kato, Toshifumi; and Ikezu, Yohei, 4,166,691, Cl. 355-11.000.

Ikonomou, Aristarchos S. Earthquake guarding system. 4,166,344, Cl. 52-167.000.

Ikuma, Fumio: *See—*
Tsuchida, Taketoshi; Shinoda, Kenichi; Yamamoto, Kohei; Ikuma, Fumio; and Tanaka, Yuzo, 4,166,532, Cl. 206-333.000.

Iles, Christopher W.: *See—*
Heritier, Francis R.; and Iles, Christopher W., 4,167,040, Cl. 364-900.000.

Imada, Akira: *See—*
Okuda, Hiroji; and Imada, Akira, 4,166,366, Cl. 64-17.0SP.

Imai, Yukio; Takeda, Kunio; and Terukina, Jiro, to Kobe Steel, Ltd. Magnetic separator. 4,166,789, Cl. 209-219.000.

Imam, Imdad; and Barkan, Philip, to General Electric Company. Hydraulically-activated operating system for an electric circuit breaker. 4,166,937, Cl. 200-82.00B.

Imura, Toshinori; and Yamanaka, Akira, to Minolta Camera Kabushiki Kaisha. Camera incorporating an electronic flash device. 4,166,681, Cl. 354-149.000.

Industrie Automation GmbH & Co.: *See—*
Menke, Josef F.; and Hofmeister, Rainer, 4,166,953, Cl. 250-333.000.

Industrie Pirelli, S.p.A.: *See—*
Gallizia, Achille, 4,166,832, Cl. 264-279.000.
Mezzanotte, Mario, 4,166,491, Cl. 152-354.00R.

Industrie-Werke Karlsruhe Augsburg Aktiengesellschaft: *See—*
Miller, Harry B., 4,166,587, Cl. 242-18.00A.

Ingenieursbureau A.P. van den Berg B.V.: *See—*
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Inoue, Shohei: *See—*
Kambe, Masaki; Takada, Tadamichi; Miyazaki, Nobuyuki; Yokokawa, Masanori; and Inoue, Shohei, 4,166,898, Cl. 528-405.000.

Inoue, Yasuyuki: *See—*
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Inoue, Yoshiaki: *See—*
Komatsu, Toshio; Inoue, Yoshiaki; and Yuyama, Megumu, 4,166,807, Cl. 252-439.000.

Inoue, Yoshihiro: *See—*
Nagasaki, Katsumi; Tanimura, Koichi; Inoue, Yoshihiro; Yamazaki, Hiroyuki; and Momose, Tetsuo, 4,166,609, Cl. 266-86.000.

Inoyama, Tadao; Aomori, Kokichi; and Terai, Hidekazu, to Hitachi, Ltd. Versatile automatic transaction equipment. 4,166,945, Cl. 235-379.000.

Institutul National Pentru Creatie Stiintifica si tehnica-"INCREST": *See—*
Ardeleanu, Stefan, 4,166,419, Cl. 104-138.00R.

Interatom, International Atomreaktorbau G.m.b.H.: *See—*
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International Business Machines Corporation: *See—*
Bacon, James L.; Ernst, Larry M.; and Hauptman, William G., 4,166,690, Cl. 355-3.0CH.
Brueckner, Karl H.; Farel, Charles A.; and Hu, Paul Y., 4,166,992, Cl. 336-155.000.
Christopherson, Warren A., 4,166,982, Cl. 330-259.000.
Curlander, Paul J.; and Rehage, Ted A., 4,167,041, Cl. 364-900.000.
Darling, Richard H.; and Perry, Francis J., 4,167,014, Cl. 346-75.000.
Hoskins, Phillip K.; and Johnson, Harmon W., 4,167,013, Cl. 346-75.000.
Hung, Roland Y.; and Shih, Kwang K., 4,167,016, Cl. 357-17.000.

International Flavors & Fragrances Inc.: *See—*
Sanders, James M.; Vinals, Joaquin F.; and Schmitt, Frederick L., 4,166,916, Cl. 568-820.000.

International Paper Company: *See—*
Beach, Ralph L., Jr.; and Fuson, William R., 4,166,567, Cl. 229-23.0BT.
Brandon, Ralph E.; Ring, Michael; and Redner, Raymond, III, 4,166,877, Cl. 428-221.000.

International Standard Electric Corporation: *See—*
Chown, Martin; and Farrington, Jeffrey G., 4,166,946, Cl. 250-199.000.
MacLeod, Alexander, 4,166,668, Cl. 350-96.200.
Ramsay, Melvin M., 4,166,670, Cl. 350-96.230.
Selway, Peter R., 4,166,932, Cl. 179-121.00R.

Inverni della Beffa S.p.A.: *See—*
Bonati, Attilio; and Mustich, Giuseppe, 4,166,861, Cl. 424-278.000.

Irby, Holcomb B. Twirl quill drill. 4,166,488, Cl. 145-61.00G.

Irick, Gether, Jr.; Ownby, James C.; and Wang, Richard H. S., to Eastman Kodak Company. Heterocyclic benzoate ultraviolet stabilizers and their use in organic compositions. 4,166,803, Cl. 252-402.000.

Isaacson, Anson; Morrison, Howard J.; Baer, Ralph H.; Fletchic, Donald K.; and Keller, Albert G., to Marvin Glass & Associates. Programmable record changer. 4,166,621, Cl. 274-1.00R.

Isaksen, Jan B.: *See—*
Skauli, Oyvind; and Isaksen, Jan B., 4,166,839, Cl. 423-311.000.

Ishibashi, Kazufumi; and Ichimura, Takeo, to Nippon Kogaku K.K. Optical glass. 4,166,746, Cl. 106-47.00Q.

Ishida, Tokuji: *See—*
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Ishidoshiro, Hiroshi: *See—*
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Ishikawajima-Harima Jukogyo Kabushiki Kaisha: *See—*
Yamazaki, Katsuhiro; Nakamura, Katsuro; and Miyake, Kiyotaka, 4,166,610, Cl. 266-89.000.

Isii, Sigeki: *See—*
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Issler, Jorg: *See—*
Wittlinger, Karl F.; and Issler, Jorg, 4,166,966, Cl. 310-111.000.

Ito, Fumio; and Yazaki, Mutsunobu, to Canon Kabushiki Kaisha. Foldable photographic apparatus. 4,166,683, Cl. 354-192.000.

Ito, Masaru; Murayama, Seiichi; Yamamoto, Manabu; and Ohishi, Kounosuke, to Hitachi, Ltd. Spectrophotometer employing magneto-optic effect. 4,166,697, Cl. 356-319.000.

Itoh, Isamu: *See—*
Ueno, Toshiyuki; Itoh, Isamu; and Morita, Yasuyuki, 4,166,509, Cl. 175-94.000.

Itoh, Kunio: *See—*
Chiba, Kiyoshi; Itoh, Kunio; Mitani, Yuji; Yonemura, Utami; and Sobajima, Shigenobu, 4,166,876, Cl. 428-215.000.

ITT Industries, Inc.: *See—*
Gilbert, Alan R., 4,166,672, Cl. 350-96.200.

Ivie, Charles V., to United States of America, National Aeronautics & Space Administration. Multi-channel rotating optical interface for data transmission. 4,166,959, Cl. 250-551.000.

J.B.R. Furniture Concepts: *See—*
DuShane, Ray N.; and Schulman, Carl H., 4,166,299, Cl. 5-18.00R.

Jacobsen, Stephen C.; Stephen, Robert L.; Luntz, Richard D.; Johnson, Richard T.; Knutti, David F.; and Mandleco, Carl F., to University of Utah Research Institute. Fluid self-sealing bioelectrode. 4,166,457, Cl. 128-639.000.

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Keizer, Alan S.; and Brown, Donald B., 4,166,562, Cl. 228-5.100.

Jaffe, Joseph: *See—*
Blanton, William A., Jr.; and Jaffe, Joseph, 4,166,787, Cl. 208-120.000.

Jahn, Walter; and Gimbel, Jurgen, to Daimler-Benz Aktiengesellschaft. Installation accommodated in a hollow vehicle bearer for the height adjustment of an upper deflection fitting for the shoulder belt of a belt system. 4,166,642, Cl. 280-806.000.

Jansing, Walter: *See—*
Rienass, Rainer; Buscher, Enno; and Jansing, Walter, 4,166,714, Cl. 417-50.000.

Janson, Richard W. Curtain suspension assembly. 4,166,306, Cl. 16-94.00R.

Jantsch, Ottomar, to Siemens Aktiengesellschaft. Apparatus and method for producing a sectional view of a body. 4,166,957, Cl. 250-445.00T.

Janzen, Jay, to Phillips Petroleum Company. Mechanical motion displacement to electrical signal converter. 4,166,950, Cl. 250-231.00R.

Japanese National Railways: *See—*
Ueno, Toshiyuki; Itoh, Isamu; and Morita, Yasuyuki, 4,166,509, Cl. 175-94.000.

Jarvik, Robert K. Repeating hemostatic clip applying instruments and multi-clip cartridges therefor. 4,166,466, Cl. 128-325.000.

Jencks, Charles L.: *See—*
Castonguay, Roger N.; and Jencks, Charles L., 4,166,989, Cl. 335-17.000.

Jenkins, James R., to Rockwell International Corporation. Restricted rate of change phase lock loop apparatus. 4,166,984, Cl. 331-1.00A.

Jenoptik Jena G.m.b.H.: *See—*
Bohme, Helmut; and Vogel, Gerhard, 4,166,401, Cl. 74-802.000.

Jensen, Robert H.; and Morris, J. Wayne, to UOP Inc. Vertical tube fired heater and process. 4,166,434, Cl. 122-356.000.

John Zink Company: *See—*
Reed, Robert D.; and Martin, Richard R., 4,166,834, Cl. 422-148.000.

Johnson, Buford D. Safety-brake control system for vehicles. 4,166,513, Cl. 180-271.000.

Johnson, Glenn W., Jr., to Amerace Corporation. Fluid pressure indicator. 4,166,430, Cl. 116-202.000.

Johnson, Harmon W.: *See—*
Hoskins, Phillip K.; and Johnson, Harmon W., 4,167,013, Cl. 346-75.000.

Johnson, John H.: *See—*
Heimsch, Robert A.; and Johnson, John H., 4,166,900, Cl. 528-491.000.

Johnson & Johnson: *See—*
Korpman, Ralf, 4,166,464, Cl. 128-287.000.
Korpman, Ralf, 4,166,706, Cl. 400-696.000.

Johnson, Richard T.: *See—*
Jacobsen, Stephen C.; Stephen, Robert L.; Luntz, Richard D.; Johnson, Richard T.; Knutti, David F.; and Mandleco, Carl F., 4,166,457, Cl. 128-639.000.

Johnson, Roy A.; and Sih, John C., to Upjohn Company, The. 5-Hydroxy-PGI$_1$ pyrrolidylamides. 4,166,903, Cl. 542-426.000.

Jones, Peter H.; Bariana, Dilbagh S.; Fung, Anthony K. L.; Martin, Yvonne C.; Kyncl, Jaroslav; and Lall, Amrit, to Abbott Laboratories. 4-Aroyl substituted phenoxy methylene-5-tetrazoles. 4,166,819, Cl. 548-253.000.

Jowett, Peter. Raney catalysts. 4,166,805, Cl. 252-430.000.

Joy, Donald N., to Crystal Chemical Company. Cacodylic acid-monosodium acid methanearsonate herbicide combination. 4,166,733, Cl. 71-97.000.

Joyce, Hardin, Jr., to Fiat-Allis Construction Machinery, Inc. Coupling hook for pulling vehicles. 4,166,633, Cl. 280-504.000.
Julius Gesellschaft m.b.H.: *See*—
Rock, Erich; and Mages, Bernhard, 4,166,307, Cl. 16-163.000.
Kabushiki Kaisha Komatsu Seisakusho: *See*—
Nakajima, Masanobu, 4,166,369, Cl. 72-26.000.
Tezuka, Iwao; and Chagawa, Chikashi, 4,166,506, Cl. 172-4.500.
Kadija, Igor V.; and Woodard, Kenneth E., Jr., to Olin Corporation. Diaphragms for use in the electrolysis of alkali metal chlorides. 4,166,785, Cl. 204-296.000.
Kahan, Lawrence: *See*—
Metzenberg, Robert L.; Larson, Frank C.; and Kahan, Lawrence, 4,166,766, Cl. 435-21.000.
Kaiser Aluminum & Chemical Corporation: *See*—
Cassens, Nicholas, Jr., 4,166,748, Cl. 106-66.000.
Kakizaki, Kimio: *See*—
Fujie, Kunio; Nakayama, Wataru; Daikoku, Takahiro; Hirasawa, Shigeki; and Kakizaki, Kimio, 4,166,498, Cl. 165-133.000.
Kalal, Jaroslav: *See*—
Bleha, Miroslav; Plichta, Zdenek; Votavova, Eva; and Kalal, Jaroslav, 4,166,804, Cl. 252-408.000.
Kambanis, Stamatis M.; Roberts, Alan D.; and Schank, Walter, to Reichhold Chemicals Limited. Hydroxy unsaturated diesters and copolymers thereof. 4,166,893, Cl. 526-75.000.
Kambe, Masaki; Takada, Tadamichi; Miyazaki, Nobuyuki; Yokokawa, Masanori; and Inoue, Shohei, to Nippon Oil Seal Industry Company Ltd. Process for producing copolymer having carbonate linkages. 4,166,898, Cl. 528-405.000.
Kanao, Mitsuhiro. Fuel composition. 4,166,724, Cl. 44-56.000.
Kandler, Joachim: *See*—
Wortmann, Joachim; Dany, Franz-Josef; and Kandler, Joachim, 4,166,743, Cl. 252-8.100.
Kania, Charles M.: *See*—
Das, Suryya K.; and Kania, Charles M., 4,166,882, Cl. 428-463.000.
Kanno, Hideo, to Nippon Kogaku K.K. Click stop device in a camera lens barrel. 4,166,675, Cl. 350-252.000.
Kanoi, Nobuo: *See*—
Sambe, Yusuke; and Kanoi, Nobuo, 4,167,026, Cl. 360-15.000.
Kanzaki Paper Manufacturing Co., Ltd.: *See*—
Watanabe, Noritoshi; Nakamura, Masato; and Fujita, Seigoro, 4,166,758, Cl. 162-117.000.
Karpik, Richard H.; and Griffiths, David H., to Owens-Corning Fiberglas Corporation. Migration-resistant forming size compositions for fibrous glass. 4,166,872, Cl. 428-35.000.
Karrer, Friedrich, to Ciba-Geigy Corporation. Bis-polyalkylpiperidines. 4,166,814, Cl. 260-45.75N.
Kasparek, Karel: *See*—
Chrtek, Milan; Tuma, Frantisek; Gabler, Josef; Kasparek, Karel; and Blasko, Jan, 4,166,356, Cl. 57-302.000.
Kassner, David A., to United States of America, Energy. Core/coil assembly for use in superconducting magnets and method for assembling the same. 4,166,990, Cl. 335-216.000.
Kasugai, Hiroshi: *See*—
Shigematsu, Taichiro; Kasugai, Hiroshi; Shibahara, Tetsuya; Nakajima, Tetsuo; and Teraoka, Toru, 4,166,846, Cl. 424-81.000.
Kato, Akihiro: *See*—
Harigane, Kotaro; Kato, Akihiro; and Fujita, Kenji, 4,166,312, Cl. 29-38.00C.
Kato, Chizuo. Mounting means for decorative device. 4,166,601, Cl. 248-226.300.
Kato, Haruhiro: *See*—
Furuta, Shigetaro; Yaguchi, Masachika; Fujino, Shigeo; and Kato, Haruhiro, 4,166,676, Cl. 350-357.000.
Kato, Toshifumi: *See*—
Ebi, Yutaka; Hirata, Tositaka; Kato, Toshifumi; and Ikezu, Yohei, 4,166,691, Cl. 355-11.000.
Kawabata, Yasuhiro: *See*—
Yamanaka, Minoru; and Kawabata, Yasuhiro, 4,166,476, Cl. 137-103.000.
Kawai, Kiyonori: *See*—
Umetani, Kohei; Date, Masakazu; and Kawai, Kiyonori, 4,166,897, Cl. 528-398.000.
Kawolics, Raymond P.; Basel, Donald R.; and Adeboi, Frans L., to Meyer Dairy Products Company, The. Floating seal for fluid control devices. 4,166,606, Cl. 251-214.000.
Kay, Daniel J.; and Patel, Rashmikant R., to NCR Corporation. Pressure-sensitive record material containing urea-formaldehyde resin pigment. 4,166,644, Cl. 282-27.500.
Kazda, Stanislav: *See*—
Wehinger, Egbert; Bossert, Friedrich; Meyer, Horst; Heise, Arend; Kazda, Stanislav; Stoepel, Kurt; and Vater, Wulf, 4,166,855, Cl. 424-266.000.
Keizer, Alan S.; and Brown, Donald B., to Jade Corporation, The. Assembly system for microcomponent devices such as semiconductor devices. 4,166,562, Cl. 228-5.100.
Keller, Albert G.: *See*—
Isaacson, Anson; Morrison, Howard J.; Baer, Ralph H.; Fletchic, Donald K.; and Keller, Albert G., 4,166,621, Cl. 274-1.00R.
Keller, Hansjurg, to Cerberus AG. Radiation detector and method of operating the same. 4,166,955, Cl. 250-342.000.
Kenney, Frank M., to U and I, Ltd. DC voltage converter and shock-type high voltage utilization devices. 4,167,036, Cl. 363-61.000.
Kerr, John L., to United States of America, Army. Terminated microstrip antenna. 4,167,010, Cl. 343-700.0MS.
Kesling, Haven S., Jr.; and Zehner, Lee R., to Atlantic Richfield Company. Preparation of unsaturated diesters by the catalytic oxidative carbonylation of diolefins with an enol ether and an alcohol. 4,166,913, Cl. 560-204.000.
Kewin, James N., to British Steel Corporation. Tuyeres with independent cooling circuits for nose and body portions. 4,166,433, Cl. 122-6.600.
Kiang, Deh J. Internal combustion engines. 4,166,435, Cl. 123-25.00B.
Kim, Hyun J. Automatic vehicle drying apparatus. 4,166,302, Cl. 15-97.00B.
Kimes, Richard C.: *See*—
Tolbert, William R.; Feder, Joseph; and Kimes, Richard C., 4,166,768, Cl. 435-286.000.
Kinch, Frederick A., Jr.; and Morgan, Barrie O., to Datotek, Inc. Multi-mode digital enciphering system with repeated priming sequences. 4,166,922, Cl. 178-22.000.
King Industries, Inc.: *See*—
Gallacher, Lawrence V.; and Rydzik, Rachelle M., 4,166,837, Cl. 423-24.000.
King, James D.; Matzkanin, George A.; and Rollwitz, William L., to Southwest Research Institute. NMR discrimination apparatus and method therefor. 4,166,972, Cl. 324-0.5AC.
Kinsey, John O., to Shakespeare of Arkansas, Inc. Variable drive clutch for fishing reel. 4,166,594, Cl. 242-214.000.
Kiper, Gerd; and Schumann, Dietmar, to Schubert & Salzer. Drive device for the detaching rollers in combing machines. 4,166,399, Cl. 74-320.000.
Kirchmeyr, Gustav; Weigl, Erwin; Knotek, Jaroslav; and Szasz, Tibor, to TMC Corporation. Attachment for release ski bindings. 4,166,634, Cl. 280-614.000.
Kirjavainen, Alvi, to Valmet Oy. Apparatus for damping pulp stock pressure fluctuations in a headbox. 4,166,759, Cl. 162-337.000.
Kirsch, Milton; and Melvold, Robert W., to Rockwell International Corporation. Testing of fibrous coalescer elements. 4,166,703, Cl. 356-442.000.
Kissick, Thomas P.: *See*—
Wade, Peter C.; Vogt, B. Richard; and Kissick, Thomas P., 4,166,910, Cl. 544-212.000.
Kistler-Morse Corporation: *See*—
Kistler, Walter P., 4,166,997, Cl. 338-5.000.
Kistler, Walter P., to Kistler-Morse Corporation. Load disc. 4,166,997, Cl. 338-5.000.
Klebba, Horst, to Volkswagenwerk Aktiengesellschaft. Door latching apparatus for a vehicle door. 4,166,645, Cl. 292-216.000.
Kleinschmit, Einhard; and Scheurenbrand, Dieter, to Daimler-Benz Aktiengesellschaft. Installation for venting fuel tanks, especially for motor vehicles. 4,166,550, Cl. 220-85.0VR.
Klinger, Helmut: *See*—
Glauert, Wolfram; and Klinger, Helmut, 4,166,977, Cl. 324-173.000.
Knight, David W., to U.S. Baird Corporation, The. Multi-station transfer press having punch extending means. 4,166,372, Cl. 72-348.000.
Knotek, Jaroslav: *See*—
Kirchmeyr, Gustav; Weigl, Erwin; Knotek, Jaroslav; and Szasz, Tibor, 4,166,634, Cl. 280-614.000.
Knusting, Gregor, to Wilhelm Stoll Maschinenfabrik GmbH. Hay-making machine. 4,166,352, Cl. 56-366.000.
Knutti, David F.: *See*—
Jacobsen, Stephen C.; Stephen, Robert L.; Luntz, Richard D.; Johnson, Richard T.; Knutti, David F.; and Mandleco, Carl F., 4,166,457, Cl. 128-639.000.
Kobayashi, Kazuo; Yuki, Kiyohiro; and Suzuki, Yutaka, to Nippon Telegraph & Telephone Public Corporation. Amplitude- and periodic phase-modulation transmission system. 4,166,923, Cl. 178-67.000.
Kobayashi, Teruo: *See*—
Shirasuna, Katuo; Kumo, Ichiro; Kobayashi, Teruo; and Ohno, Shigeo, 4,166,586, Cl. 242-18.0PW.
Kobe Steel, Ltd.: *See*—
Hayashi, Kuniaki; and Tomoyasu, Takatoshi, 4,166,879, Cl. 428-385.000.
Imai, Yukio; Takeda, Kunio; and Terukina, Jiro, 4,166,789, Cl. 209-219.000.
Koeppel, Robert, to Produits Chimiques Ugine Kuhlmann. Anhydrite concrete and method for preparing building elements. 4,166,750, Cl. 106-109.000.
Koff, Fred W.: *See*—
Tunick, Allen A.; Koff, Fred W.; and Sifniades, Stylianos, 4,166,842, Cl. 423-387.000.
Kohzu, Minoru, to Nippon Gakki Seizo Kabushiki Kaisha. Tennis racket. 4,166,616, Cl. 273-73.00G.
Komatsu, Toshio; Inoue, Yoshiaki; and Yuyama, Megumu, to Mitsubishi Gas Chemical Company, Inc. Oxygen absorbent. 4,166,807, Cl. 252-439.000.
Komeiji, Azuma; and Murakami, Nobuo, to Idemitsu Kosan Co., Ltd. Method for setting gypsum utilizing retarder. 4,166,751, Cl. 106-112.000.
Konejukka Oy: *See*—
Sassi, Kari, 4,166,575, Cl. 236-12.00R.
Koppe, Herbert: *See*—
Stahle, Helmut; Koppe, Herbert; Kummer, Werner; and Hoefke, Wolfgang, 4,166,859, Cl. 424-273.00R.
Korneev, Vladimir A.: *See*—
Stepantsov, Georgy K.; Abramov, Valentin S.; Bloschitsyn, Jury N.; Zaripov, Raif R.; Babko, Alexandr A.; Kutlin, Ferdinand K.; Glazunov, Ivan V.; Nilov, Alexei A.; Kuznetsov, Gennady V.; Viter, Petr A.; Pavlov, Alexandr F.; Belonog, Valery M.; Korneev, Vladimir A.; and Zvereva, Emilia I., 4,166,375, Cl. 72-430.000.

Korpman, Ralf, to Johnson & Johnson. Absorbent dressing. 4,166,464, Cl. 128-287.000.

Korpman, Ralf, to Johnson & Johnson. Lift-off tape and process. 4,166,706, Cl. 400-696.000.

Korstad, Ralph J.; Hall, Wilbur L.; Wu, Ching H.; and Brown, Alfred, to Texaco Inc. High vertical conformance steam drive oil recovery method. 4,166,501, Cl. 166-263.000.

Korstad, Ralph J.: *See*—
Hall, Wilbur L.; Brown, Alfred; and Korstad, Ralph J., 4,166,502, Cl. 166-263.000.
Hall, Wilbur L.; Brown, Alfred; and Korstad, Ralph J., 4,166,503, Cl. 166-263.000.

Kort, Werner; and Gall, Ewald, to Maschinenbau Oppenweiler GmbH. Mechanism for chip-cutting and chip-ejection in the perforation of signatures. 4,166,613, Cl. 270-21.000.

Kosicki, Witold W.; Corris, Charles J.; and Potter, Robert T., to Horsman Dolls Inc. Doll with heartbeat simulator. 4,166,337, Cl. 46-232.000.

Kowalsi, Gunter, to U.S. Philips Corporation. Device for measuring the distribution of the absorption of the emission of radiation in a layer of a body. 4,167,039, Cl. 364-515.000.

Koyo Seiko Company Limited: *See*—
Okuda, Hiroji; and Imada, Akira, 4,166,366, Cl. 64-17.0SP.

Kraftwerk Union Aktiengesellschaft: *See*—
Dannehl, Gunther, 4,166,395, Cl. 73-634.000.

Krapcho, John; and Turk, Chester F., to E. R. Squibb & Sons, Inc. 3,3-Dichloro-2-azetidinone derivatives having antiinflammatory activity. 4,166,907, Cl. 544-111.000.

Krasser, Fritz, to Ellenberger & Poensgen GmbH. Push button actuated bimetal controlled excess current switch. 4,166,993, Cl. 337-66.000.

Kratzer, Erich E. F. Spent shell container. 4,166,333, Cl. 42-1.00T.

Krause, Richard H.: *See*—
Schenck, Arthur J.; and Krause, Richard H., 4,167,004, Cl. 340-679.000.

Krehbiel, Vivian D.; and Marvin, Roger L., to Kreonite Inc. Self-threading take-up magazine for a photographic printer. 4,166,588, Cl. 242-67.10R.

Kreonite Inc.: *See*—
Krehbiel, Vivian D.; and Marvin, Roger L., 4,166,588, Cl. 242-67.10R.

Kress, Dieter; and Haberle, Friedrich, to Mapal Fabrik fur Prazisionswerkzeuge Dr. Kress KG. Chucking reamer with replaceable cutter. 4,166,711, Cl. 408-233.000.

Krupp-Koppers GmbH: *See*—
Staege, Hermann, 4,166,731, Cl. 62-46.000.

Kubota, Ltd.: *See*—
Nagasaki, Katsumi; Tanimura, Koichi; Inoue, Yoshihiro; Yamazaki, Hiroyuki; and Momose, Tetsuo, 4,166,609, Cl. 266-86.000.

Kuelzer, Peter: *See*—
Rekewitz, Rudolf; and Kuelzer, Peter, 4,166,314, Cl. 29-517.000.

Kuhn, S.A.: *See*—
Werner, Anton, 4,166,350, Cl. 56-320.100.

Kuhnel, Werner: *See*—
Hohmann, Walter; and Kuhnel, Werner, 4,166,822, Cl. 260-380.000.

Kuki, Akio: *See*—
Nanbu, Kenji; and Kuki, Akio, 4,166,623, Cl. 274-1.00R.

Kummer, Werner: *See*—
Stahle, Helmut; Koppe, Herbert; Kummer, Werner; and Hoefke, Wolfgang, 4,166,859, Cl. 424-273.00R.

Kummetz, Hans E. Elastic connection assembly for the mast of a sailboat. 4,166,425, Cl. 114-39.000.

Kumo, Ichiro: *See*—
Shirasuna, Katuo; Kumo, Ichiro; Kobayashi, Teruo; and Ohno, Shigeo, 4,166,586, Cl. 242-18.0PW.

Kunz, Volker G.: *See*—
Acimovic, Simeon; Lindemann, Karl H.; and Kunz, Volker G., 4,166,778, Cl. 204-55.00R.

Kurokawa, Yasuyoshi: *See*—
Noguchi, Hiroshi; and Kurokawa, Yasuyoshi, 4,166,615, Cl. 271-259.000.

Kurooka, Shigeru; and Sunahara, Noriyuki, to Dainippon Pharmaceutical Co., Ltd. Insolubilized antibody. 4,166,767, Cl. 435-7.000.

Kurtz, Robert J.: *See*—
Findl, Eugene; and Kurtz, Robert J., 4,166,455, Cl. 128-691.000.

Kurumada, Tomoyuki: *See*—
Soma, Nobuo; Morimura, Syoji; Yoshioka, Takao; and Kurumada, Tomoyuki, 4,166,813, Cl. 260-45.80N.

Kutlin, Ferdinand K.: *See*—
Stepantsov, Georgy K.; Bloschitsyn, Jury N.; Babko, Alexandr A.; Kutlin, Ferdinand K.; and Glazunov, Ivan V., 4,166,374, Cl. 72-430.000.
Stepantsov, Georgy K.; Abramov, Valentin S.; Bloschitsyn, Jury N.; Zaripov, Raif R.; Babko, Alexandr A.; Kutlin, Ferdinand K.; Glazunov, Ivan V.; Nilov, Alexei A.; Kuznetsov, Gennady V.; Viter, Petr A.; Pavlov, Alexandr F.; Belonog, Valery M.; Korneev, Vladimir A.; and Zvereva, Emilia I., 4,166,375, Cl. 72-430.000.

Kuznetsov, Gennady V.: *See*—
Stepantsov, Georgy K.; Abramov, Valentin S.; Bloschitsyn, Jury N.; Zaripov, Raif R.; Babko, Alexandr A.; Kutlin, Ferdinand K.; Glazunov, Ivan V.; Nilov, Alexei A.; Kuznetsov, Gennady V.; Viter, Petr A.; Pavlov, Alexandr F.; Belonog, Valery M.; Korneev, Vladimir A.; and Zvereva, Emilia I., 4,166,375, Cl. 72-430.000.

Kwiecinski, Timothy J.: *See*—
DiDonato, Joseph S., Jr.; and Kwiecinski, Timothy J., 4,166,403, Cl. 83-13.000.

Kyncl, Jaroslav: *See*—
Jones, Peter H.; Bariana, Dilbagh S.; Fung, Anthony K. L.; Martin, Yvonne C.; Kyncl, Jaroslav; and Lall, Amrit, 4,166,819, Cl. 548-253.000.

LaBorde, Bennett P., Jr. Large model boat assembly. 4,166,335, Cl. 46-1.00R.

Lacroix, Jean-Claude, to Compagnie Industrielle des Telecommunications Cit-Alcatel. Circuit for limiting the output voltage of an amplifier. 4,166,983, Cl. 330-297.000.

Lafferty, Gary S., Sr., to Milwaukee Electric Tool Corporation. Coupling for quick connection of elements. 4,166,708, Cl. 403-342.000.

Laitram Corporation, The: *See*—
Lapeyre, James M., 4,166,383, Cl. 73-136.00A.

Lall, Amrit: *See*—
Jones, Peter H.; Bariana, Dilbagh S.; Fung, Anthony K. L.; Martin, Yvonne C.; Kyncl, Jaroslav; and Lall, Amrit, 4,166,819, Cl. 548-253.000.

Lama, Antonio, to Societa Alluminio e Metalli Alumetal S.p.A. Electrolytic process for producing aluminium. 4,166,779, Cl. 204-67.000.

Lampic, Milan: *See*—
Berger, Peter; Lampic, Milan; Muller, Jorg; and Orths, Kurt, 4,166,378, Cl. 73-15.00B.

Lanfermann, Willy: *See*—
Oberste-Beulmann, Klaus; Schupphaus, Herbert; Borowski, Karl-Heinz; Lanfermann, Willy; and Henrich, Friedhelm, 4,166,652, Cl. 299-43.000.

Langlais, Eugene L.: *See*—
Casson, Edward A., Jr.; Gaul, Albro T.; Langlais, Eugene L.; Shadlen, Gerald; and Vanaver, Eugene L., 4,166,777, Cl. 204-28.000.

Lanter, Kent J.: *See*—
Betz, Norman L.; Lanter, Kent J.; Breuer, Leslie H.; and Steinke, Frederick H., 4,166,867, Cl. 426-73.000.

Lapeyre, James M., to Laitram Corporation, The. Optical shaft torque meter. 4,166,383, Cl. 73-136.00A.

Larson, Frank C.: *See*—
Metzenberg, Robert L.; Larson, Frank C.; and Kahan, Lawrence, 4,166,766, Cl. 435-21.000.

Latsch, Reinhard: *See*—
Bianchi, Valerio; Latsch, Reinhard; and Schmidt, Peter-Jurgen, 4,166,437, Cl. 123-32.0EC.

Laurent, Robert E. L., to Electricite de France (Service National). Methods of and thermodynamic apparatuses for power production. 4,166,362, Cl. 60-39.18R.

Law, Chi Y. Three dimension camera having a film holder. 4,166,684, Cl. 354-203.000.

Lazerand, Jean; and Risbec, Andre, to Colgate-Palmolive Company. Package with handle. 4,166,570, Cl. 229-52.00B.

Lear Siegler, Inc.: *See*—
Prittie, Robert N., 4,166,968, Cl. 310-239.000.

Leavitt, Leland F., to United States of America, Air Force. Obturating split disc. 4,166,416, Cl. 102-2.000.

Lee, Gim F., Jr., to General Electric Company. Filled compositions of a polyphenylene ether resin and rubber-modified alkenyl aromatic resins. 4,166,812, Cl. 260-42.470.

Leeds, Winthrop M. Combined trash receptacle for table use. 4,166,572, Cl. 232-1.00R.

Lefebvre, Jacques; and Mazodier, Jean-Louis, to Societe de Vente de l'Aluminium Pechiney. Method for the preparation of a piston made of aluminum alloy with its surface treated so as not to seize on contact with a cylinder with an internal wall made of aluminum alloy. 4,166,776, Cl. 204-25.000.

Lemelson, Jerome H. Key and coin holder. 4,166,489, Cl. 150-35.000.

Leonberger, Frederick J.; and Donnelly, Joseph P., to Massachusetts Institute of Technology. Planar optical waveguide, modulator, variable coupler and switch. 4,166,669, Cl. 350-96.140.

Leroy, Jules: *See*—
Bauer, Daniel; Leroy, Jules; and Beck, Jean-Paul, 4,166,473, Cl. 132-9.000.

Lile, Derek L.: *See*—
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Lilly, A. Clifton, Jr.; Watson, Francis M., III; Martin, Peter; and Price, John S., to Philip Morris Incorporated. Method and system for detection of thin metal layers in packaged articles. 4,166,973, Cl. 324-58.50B.

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Ross, William J.; Verge, John P.; and Williamson, William R. N., 4,166,818, Cl. 548-128.000.

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Lindner, Hans A.; and Thoma, Hans-Jurgen, to Cremer & Breuer Keramische Betriebe GmbH. Process and apparatus for automatic, continuous, destruction-free checking, especially of stoneware pipes. 4,166,393, Cl. 73-579.000.

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Lisfeld, Robert; Wieber, Karl; and Stankewitz, Hans-Werner, to Ernst Leitz Wetzlar GmbH. Apparatus for simultaneous adjustment of the position and aperture of a microscope field stop. 4,166,671, Cl. 350-87.000.

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Benes, Ewald; and Hammer, Dieter, 4,166,967, Cl. 310-338.000.

List, Richard A. Skateboard truck. 4,166,629, Cl. 280-11.280.

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Littleford, Philip O. Apparatus and method for inserting an electrode. 4,166,469, Cl. 128-784.000.

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Maughmer, Robert W., 4,166,406, Cl. 89-1.815.

Lloyd, Samuel H., III, to Santa Fe International Corporation. Method of construction of twin hull variable draft vessel. 4,166,426, Cl. 114-65.00R.

Loferski, Joseph J.; and Roessler, Barton, to Solamat Incorporated. Solar energy device. 4,166,880, Cl. 428-457.000.

Loiseau, Gerard P. M. H.; Mattioda, Georges D.; Millischer, Rene J.; and Obellianne, Pierre M. J., to Produits Chimiques Ugine Kuhlmann. Piperazino-pyrimidines and their use as spasmolytic agents. 4,166,852, Cl. 424-251.000.

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Baldwin, John J.; and Lumma, William C., Jr., 4,166,851, Cl. 424-248.550.

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Jacobsen, Stephen C.; Stephen, Robert L.; Luntz, Richard D.; Johnson, Richard T.; Knutti, David F.; and Mandleco, Carl F., 4,166,457, Cl. 128-639.000.

Lutz, Albert W.; and Diehl, Robert E., to American Cyanamid Company. 2,6-Dinitroaniline herbicides. 4,166,908, Cl. 544-166.000.

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Maag, Oskar, 4,166,323, Cl. 33-179.50R.

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MacLeod, Alexander, to International Standard Electric Corporation. Fiber optic arrangements. 4,166,668, Cl. 350-96.200.

MacPherson, William F.; and McNair, Irving M., Jr., to Bell Telephone Laboratories, Incorporated. Miniature bridge lifter for telephone lines. 4,166,931, Cl. 179-35.000.

Maeda, Isamu; and Aoshima, Masashi, to Sumitomo Chemical Company, Limited. Process for vulcanizing rubber at a low temperature. 4,166,892, Cl. 525-373.000.

Maes, Michel E.: *See—*
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Mages, Bernhard: *See—*
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Magic, Susan E.: *See—*
Plattner, Jacob J.; Voss, Houston F.; and Magic, Susan E., 4,166,825, Cl. 260-455.00R.

Magnat, Pierre. Apparatus for tracing ellipses. 4,166,320, Cl. 33-31.000.

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Szabo, Imre Z.; Nagy, Kornel; and Finta, Csaba, 4,166,377, Cl. 73-11.000.

Maitani, Yoshihisa, to Olympus Optical Co., Ltd. Strobo unit for camera. 4,166,680, Cl. 354-126.000.

Maitland, Robert L., to Masti-Kure Products Company, Inc. Biostable self-contained package of a plurality of veterinarian syringes. 4,166,533, Cl. 206-366.000.

Malachesky, Paul A.: *See—*
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Maloney, Michael J. Skateboard brake. 4,166,519, Cl. 188-29.000.

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Mandleco, Carl F.: *See—*
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Mann, Theo: *See—*
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Mapal Fabrik fur Prazisionswerkzeuge Dr. Kress KG: *See—*
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Marchasson, Bernard; and Migeon, Rene, to Compagnie Industrielle des Telecommunications Cit-Alcatel. Continuous signal amplitude regulator. 4,166,981, Cl. 330-52.000.

Marr, Peter W.; Beattie, Douglas W.; and Easton, James D., to Dominion Colour Company Ltd. Pigment compositions and methods of preparation. 4,166,811, Cl. 260-27.00R.

Marrero, Louis. Modular electrical switch/outlet assembly. 4,166,934, Cl. 200-51.00R.

Marshall, Francis G.: *See—*
McArdle, James M.; Idec, Eric J.; and Marshall, Francis G., 4,166,474, Cl. 132-88.700.

Marshall, Robert, to A. C. Nielsen Company. Document sorter utilizing cascaded sorting steps. 4,166,540, Cl. 209-555.000.

Martenson, Donald S. Fireplace furnace with heat exchange tubes. 4,166,444, Cl. 126-121.000.

Martin, Peter: *See—*
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Martin, Richard R.: *See—*
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Jones, Peter H.; Bariana, Dilbagh S.; Fung, Anthony K. L.; Martin, Yvonne C.; Kyncl, Jaroslav; and Lall, Amrit, 4,166,819, Cl. 548-253.000.

Martinussen, Svein; Roaldsnes, Leiv; and Roed, Harald, to A/S Hydraulik Brattvaag. Method and apparatus for transferring cargo between an ocean-located unit and a vessel. 4,166,545, Cl. 414-139.000.

Maruyama, Takashi; and Ueno, Katsuji, to Sumitomo Chemical Company, Limited. Isolation of aromatic polyester copolymers. 4,166,899, Cl. 528-480.000.

Marvin Glass & Associates: *See—*
Isaacson, Anson; Morrison, Howard J.; Baer, Ralph H.; Fletchic, Donald K.; and Keller, Albert G., 4,166,621, Cl. 274-1.00R.

Marvin, Mark C. Sewage gas collection reservoir. 4,166,791, Cl. 210-120.000.

Marvin, Roger L.: *See—*
Krehbiel, Vivian D.; and Marvin, Roger L., 4,166,588, Cl. 242-67.10R.

Marx, Gerhard: *See—*
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Masi, Paolo: *See—*
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Massachusetts Institute of Technology: *See—*
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Mastroianni, Martin J.; Orfeo, Sabatino R.; and Sukornick, Bernard, to Allied Chemical Corporation. Electrical device with fluorinated divalent sulfur dielectric gas. 4,166,798, Cl. 252-63.500.

Matsuda, Motonobu; Sahara, Masayoshi; and Ishida, Tokuji, to Minolta Camera Kabushiki Kaisha. Exposure information setting circuit. 4,166,679, Cl. 354-60.00R.

Matsuda, Yasumasa; Yamada, Kazuji; Shimada, Satoshi; Nishihara, Motohisa; Yasuda, Tomio; Tsuchiya, Masatoshi; Soeno, Ko; Ai, Mitsuo; Nagata, Takeo; and Matsuoka, Yoshitaka, to Hitachi, Ltd. Semiconductor transducer. 4,166,384, Cl. 73-141.00A.

Matsumoto, Yoshimitsu: *See—*
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Matsuda, Yasumasa; Yamada, Kazuji; Shimada, Satoshi; Nishihara, Motohisa; Yasuda, Tomio; Tsuchiya, Masatoshi; Soeno, Ko; Ai, Mitsuo; Nagata, Takeo; and Matsuoka, Yoshitaka, 4,166,384, Cl. 73-141.00A.

Matsushita Electric Industrial Co., Ltd.: *See—*
Misawa, Yoshihiko; Mori, Kazuhiro; and Araki, Shigeru, 4,166,316, Cl. 29-626.000.
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Matsushita Electric Industries Co., Ltd.: *See—*
Nanbu, Kenji; and Kuki, Akio, 4,166,623, Cl. 274-1.00R.

Matthies, Alan A., to Singer Company, The. Thermostatic control device. 4,166,996, Cl. 337-386.000.

Mattioda, Georges D.: *See—*
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McCartney, Joseph F.; and Shipman, William H., to United States of America, Navy. Position insensitive battery. 4,166,884, Cl. 429-10.000.

McClelland, Brian, to Cardio Technology Limited. Body electrodes. 4,166,453, Cl. 128-639.000.
McClure, Charles A. Flow monitoring. 4,166,387, Cl. 73-194.00F.
McCready, John E., to United States of America, Army. Crashworthy fuel cell repair. 4,166,874, Cl. 428-35.000.
McDevitt, Robert F. Molten metal sampler. 4,166,391, Cl. 73-425.40R.
McDonald, Charles J., to Dow Chemical Company, The. Preparation of N-(aminomethyl)-α,β-ethylenically unsaturated carboxamides and their polymers. 4,166,828, Cl. 260-561.00N.
McDonnell Douglas Corporation: *See*—
Schwartz, Walter, 4,167,009, Cl. 343-18.00B.
McGeoch, Ian L. M.; and Stawell, William B. Method and apparatus for identifying radar targets. 4,167,007, Cl. 343-6.5LC.
McGowan, Malissa. Bathtub shroud. 4,166,294, Cl. 4-162.000.
McGraw, Thomas F. Low cost solar collector. 4,166,445, Cl. 126-432.000.
McKay, Dwight L.; and Bertus, Brent J., to Phillips Petroleum Company. Cracking catalyst passivated with a crude antimony phosphorodithioate. 4,166,806, Cl. 252-437.000.
McLean, Robert L.: *See*—
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McNair, Irving M., Jr.: *See*—
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McPhee, William A., to Dresser Industries, Inc. Well logging method and apparatus using friction-reducing agents. 4,166,300, Cl. 166-250.000.
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Mehnert, Wolfgang. Linear diene polymer having reactive terminal groups and method of preparing the same. 4,166,829, Cl. 260-602.000.
Meijer, Robert. Cardiac monitor. 4,166,454, Cl. 128-666.000.
Meili, Ernst, to Cerberus AG. Smoke detector. 4,166,960, Cl. 250-574.000.
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Menard, Marcel; Lim, Gary M. F.; and Conway, Terry T., to Bristol-Myers Company. O-2-Locephem-4-carboxylic acid derivatives as antibacterial agents. 4,166,905, Cl. 544-105.000.
Menard, Marcel; Lim, Gary M. F.; and Conway, Terry T., to Bristol-Myers Company. 0-2-Isocephem-4-carboxylic acid derivatives as antibacterial agents. 4,166,906, Cl. 544-105.000.
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Menke, Josef F.; and Hofmeister, Rainer, to Industrie Automation GmbH & Co. Adaptor in form of a spectral converter. 4,166,953, Cl. 250-333.000.
Merck & Co., Inc.: *See*—
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Metcalf, Eric, to Solartron Electronic Group Limited, The. Buffer circuit for a data highway. 4,166,963, Cl. 307-260.000.
Metzenberg, Robert L.; Larson, Frank C.; and Kahan, Lawrence, to Wisconsin Alumni Research Foundation. Method for quantitative assay of alkaline phosphatase isoenzymes in serum. 4,166,766, Cl. 435-21.000.
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Mezzanotte, Mario, to Industrie Pirelli, S.p.A. Radial pneumatic tires having reinforced sidewalls. 4,166,491, Cl. 152-354.00R.
Mifune, Hiroyuki; Takada, Shunji; Akimura, Yoshitaka; and Shishido, Tadao, to Fuji Photo Film Co., Ltd. Contrasty light-sensitive silver halide material containing a hydrazine derivative and a heterocyclic mercaptan. 4,166,742, Cl. 96-107.000.
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Milants, Lodewijk L., to U.S. Philips Corporation. Cassette housing with integral tape guide. 4,166,593, Cl. 242-199.000.
Milici, Richard C.: *See*—
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Milke, Siegfried: *See*—
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Miller, Bertram W. Method and apparatus for ascertaining color balance of photographic printing paper. 4,166,701, Cl. 356-404.000.
Miller, Gerald K.; and Wooden, William G. Ventilation system. 4,166,448, Cl. 126-299.00D.
Miller, Harry B., to Industrie-Werke Karlsruhe Augsburg Aktiengesellschaft. Method and aparatus for transferring yarn on a nearly full package to an empty bobbin. 4,166,587, Cl. 242-18.00A.
Miller, Maurice L.: *See*—
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Mitsui, Hisashi, to Ozawa, Miya. Anti-nicotine agent prepared from a saccharide and rosin or turpentine. 4,166,847, Cl. 424-180.000.
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Monahan, Brian J. Orthographic to axonometric plotting apparatus. 4,166,321, Cl. 33-432.000.
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Monroe, Kenneth E.: *See*—
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Howe, Robert K., 4,166,732, Cl. 71-92.000.
Tolbert, William R.; Feder, Joseph; and Kimes, Richard C., 4,166,768, Cl. 435-286.000.
Montren, William T., to Arbrook, Inc. Electronic thermometer probe assembly. 4,166,389, Cl. 73-343.00R.

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Moore, Michael R. P. Method for converting a disposable storage container to a bird nesting box and articles of manufacture associated therewith. 4,166,432, Cl. 119-23.000.

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Mottine, John J.: *See—*
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Mougin, Georges L., to Societe ITI Ltd. Method of energy conversion utilizing a tubular iceberg. 4,166,363, Cl. 60-641.000.

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Mueller, Max A.; McLean, Robert L.; Holmes, Curtis F.; and Greatbatch, Wilson, to Wilson Greatbatch Ltd. Lithium halogen cell including activated charcoal. 4,166,887, Cl. 429-191.000.

Muller, Jorg: *See—*
Berger, Peter; Lampic, Milan; Muller, Jorg; and Orths, Kurt, 4,166,378, Cl. 73-15.00B.

Muller, Walter, to Ruti Machinery Works Limited. Apparatus for forming leno selvedges in weaving machines. 4,166,480, Cl. 139-54.000.

Murakami, Nobuo: *See—*
Komeiji, Azuma; and Murakami, Nobuo, 4,166,751, Cl. 106-112.000.

Murayama, Seiichi: *See—*
Ito, Masaru; Murayama, Seiichi; Yamamoto, Manabu; and Ohishi, Kounosuke, 4,166,697, Cl. 356-319.000.

Murphy, William W., to Torrington Company, The. Roller assembly with roller retention spring. 4,166,660, Cl. 308-202.000.

Murtha, Timothy P., to Phillips Petroleum Company. Extractive distillation separation of cumene and phenol. 4,166,772, Cl. 203-60.000.

Muskens, Peter: *See—*
Geers, Leo; Muskens, Peter; and Schillings, Dieter, 4,166,611, Cl. 267-3.000.

Mustich, Giuseppe: *See—*
Bonati, Attilio; and Mustich, Giuseppe, 4,166,861, Cl. 424-278.000.

Myerscough, Rex E. Bumper hitch assembly. 4,166,632, Cl. 280-502.000.

N. B. F. Company, Inc.: *See—*
Foley, Newman C., 4,167,002, Cl. 340-59.000.

Nagasaki, Katsumi; Tanimura, Koichi; Inoue, Yoshihiro; Yamazaki, Hiroyuki; and Momose, Tetsuo, to Kubota, Ltd. Device for detecting surface level of scum in scum removing apparatus. 4,166,609, Cl. 266-86.000.

Nagata, Takeo: *See—*
Matsuda, Yasumasa; Yamada, Kazuji; Shimada, Satoshi; Nishihara, Motohisa; Yasuda, Tomio; Tsuchiya, Masatoshi; Soeno, Ko; Ai, Mitsuo; Nagata, Takeo; and Matsuoka, Yoshitaka, 4,166,384, Cl. 73-141.00A.

Nagy, Kornel: *See—*
Szabo, Imre Z.; Nagy, Kornel; and Finta, Csaba, 4,166,377, Cl. 73-11.000.

Nakada, Akira: *See—*
Hiyoshi, Teruo; Nakada, Akira; Yamada, Shigeru; Ichikawa, Kiyoshi; and Isii, Sigeki, 4,166,405, Cl. 84-1.240.

Nakaji, Hideki: *See—*
Okunishi, Hiromu; Nakaji, Hideki; Suwa, Hiroyuki; and Sato, Hideaki, 4,166,521, Cl. 188-251.00M.

Nakajima, Masanobu, to Kabushiki Kaisha Komatsu Seisakusho. Safety device for press brake. 4,166,369, Cl. 72-26.000.

Nakajima, Tetsuo: *See—*
Shigematsu, Taichiro; Kasugai, Hiroshi; Shibahara, Tetsuya; Nakajima, Tetsuo; and Teraoka, Toru, 4,166,846, Cl. 424-81.000.

Nakamura, Katsuro: *See—*
Yamazaki, Katsuhiro; Nakamura, Katsuro; and Miyake, Kiyotaka, 4,166,610, Cl. 266-89.000.

Nakamura, Kenji: *See—*
Fujii, Toshikazu; and Nakamura, Kenji, 4,166,889, Cl. 521-55.000.

Nakamura, Masato: *See—*
Watanabe, Noritoshi; Nakamura, Masato; and Fujita, Seigoro, 4,166,758, Cl. 162-117.000.

Nakano, Hitoshi: *See—*
Fujii, Katsuhiko; Nakano, Hitoshi; and Mitsui, Tetsuro, 4,166,523, Cl. 188-322.000.

Nakayama, Wataru: *See—*
Fujie, Kunio; Nakayama, Wataru; Daikoku, Takahiro; Hirasawa, Shigeki; and Kakizaki, Kimio, 4,166,498, Cl. 165-133.000.

Nakazato, Masao; Yuminaka, Takeo; and Yoneda, Kenji, to Hitachi, Ltd. Elevator control system. 4,166,518, Cl. 187-29.00R.

Nanbu, Kenji; and Kuki, Akio, to Matsushita Electric Industries Co., Ltd. Pickup needle cleaning device for record disc playback apparatus. 4,166,623, Cl. 274-1.00R.

Narita, Kazutaka: *See—*
Ohba, Kenichi; and Narita, Kazutaka, 4,167,018, Cl. 357-51.000.

National Research Development Corporation: *See—*
Hill, David W.; and Pike, Edward R., 4,166,695, Cl. 356-28.000.

NCR Corporation: *See—*
Kay, Daniel J.; and Patel, Rashmikant R., 4,166,644, Cl. 282-27.500.

Neely, Homer E., Jr., to PPG Industries, Inc. Glass fiber composition. 4,166,747, Cl. 106-50.000.

Neomed Incorporated: *See—*
Esty, Janet M.; and Cox, John A., 4,166,465, Cl. 128-303.130.

Neumann, Robert A., to Medtronic, Inc. Externally controlled and powered cardiac stimulating apparatus. 4,166,470, Cl. 128-419.0PG.

New Hermes, Incorporated: *See—*
Rosenberg, Edward D., 4,166,319, Cl. 33-24.00B.

Niedecker, Herbert. U-shaped shut-off clips. 4,166,571, Cl. 229-65.000.

Nielson, Charles E.: *See—*
Rothe, Kurt; Furst, Raymond B.; and Nielson, Charles E., 4,166,310, Cl. 29-23.500.

Nienberg, Raymond F. Agricultural do-all machine. 4,166,351, Cl. 56-192.000.

Nightingale, Frank J., to Union Camp Corporation. Cervical traction unit. 4,166,459, Cl. 128-75.000.

Nilov, Alexei A.: *See—*
Stepantsov, Georgy K.; Abramov, Valentin S.; Bloschitsyn, Jury N.; Zaripov, Raif R.; Babko, Alexandr A.; Kutlin, Ferdinand K.; Glazunov, Ivan V.; Nilov, Alexei A.; Kuznetsov, Gennady V.; Viter, Petr A.; Pavlov, Alexandr F.; Belonog, Valery M.; Korneev, Vladimir A.; and Zvereva, Emilia I., 4,166,375, Cl. 72-430.000.

Nilsen, Carl G.; and Gabel, Richard A., to Pennwalt Corporation. Counterbalancing mechanism for X-ray tubeheads. 4,166,602, Cl. 248-280.100.

Nippon Gakki Seizo Kabushiki Kaisha: *See—*
Hiyoshi, Teruo; Nakada, Akira; Yamada, Shigeru; Ichikawa, Kiyoshi; and Isii, Sigeki, 4,166,405, Cl. 84-1.240.
Kohzu, Minoru, 4,166,616, Cl. 273-73.00G.

Nippon Kayaku Kabushiki Kaisha: *See—*
Sakamoto, Koji; Asano, Takeshi; Mizuochi, Kazuo; Sasaki, Kanemichi; and Hasegawa, Kouji, 4,166,865, Cl. 424-285.000.

Nippon Kogaku K.K.: *See—*
Ishibashi, Kazufumi; and Ichimura, Takeo, 4,166,746, Cl. 106-47.00Q.
Kanno, Hideo, 4,166,675, Cl. 350-252.000.

Nippon Oil Seal Industry Company Ltd.: *See—*
Kambe, Masaki; Takada, Tadamichi; Miyazaki, Nobuyuki; Yokokawa, Masanori; and Inoue, Shohei, 4,166,898, Cl. 528-405.000.

Nippon Telegraph & Telephone Public Corporation: *See—*
Kobayashi, Kazuo; Yuki, Kiyohiro; and Suzuki, Yutaka, 4,166,923, Cl. 178-67.000.

Nishihara, Motohisa: *See—*
Matsuda, Yasumasa; Yamada, Kazuji; Shimada, Satoshi; Nishihara, Motohisa; Yasuda, Tomio; Tsuchiya, Masatoshi; Soeno, Ko; Ai, Mitsuo; Nagata, Takeo; and Matsuoka, Yoshitaka, 4,166,384, Cl. 73-141.00A.

Nixon, Bill M.; and Thornburg, Perry A., to Champion International Corporation. Easy opening envelope. 4,166,538, Cl. 206-628.000.

Noakes, Jack E.; and Terner, Leslie L., to Ford Motor Company. Method for making pure beta silicon carbide. 4,166,841, Cl. 423-345.000.

Nogradi, Mihaly: *See—*
Feuer, Laszlo; Nogradi, Mihaly; Gettsegen, Agnes; Vermes, Borbala; Strelisky, Janos; Wolfner, Andras; Farkas, Lorant; Antus, Sandor; and Toth, Maria K., 4,166,862, Cl. 424-283.000.

Noguchi, Hiroshi; and Kurokawa, Yasuyoshi, to Sharp Kabushiki Kaisha. Means for determining difference in copy sheet transportation states for an electrostatic reproduction machine. 4,166,615, Cl. 271-259.000.

Noguchi, Isamu. Lampstand for lampshade. 4,167,034, Cl. 362-414.000.

Norby, Thomas E., to Cutler-Hammer, Inc. Alternately-operable two-pushbutton switch. 4,166,935, Cl. 200-72.00R.

Nordlund, Lage A., to Pharmacia Fine Chemicals. Programmable fraction collector. 4,166,483, Cl. 141-1.000.

Norris Industries, Inc.: *See—*
Claucherty, Robert E., 4,166,653, Cl. 301-37.0SS.

Norsk Hydro A.S: *See—*
Skauli, Oyvind; and Isaksen, Jan B., 4,166,839, Cl. 423-311.000.

Northern Illinois Gas Company: *See—*
Batz, James E., 4,166,380, Cl. 73-23.000.

Nostrand, Gerald E.; and Hanak, Joseph J., to RCA Corporation. Method of removing the effects of electrical shorts and shunts created during the fabrication process of a solar cell. 4,166,918, Cl. 136-89.00R.

Obellianne, Pierre M. J.: *See—*
Loiseau, Gerard P. M. H.; Mattioda, Georges D.; Millischer, Rene J.; and Obellianne, Pierre M. J., 4,166,852, Cl. 424-251.000.

Oberg, Lars-Gunnar, to AB Bygg-och Transportekonomi (BT). Lift truck with tiltable and rotatable lifting yoke. 4,166,712, Cl. 414-732.000.

Oberste-Beulmann, Klaus; Schupphaus, Herbert; Borowski, Karl-Heinz; Lanfermann, Willy; and Henrich, Friedhelm, to Gebr. Eickhoff Maschinenfabrik und Eisengiesserei m.b.H. Mining machine, particularly for the working of low mine seams. 4,166,652, Cl. 299-43.000.

O'Brian, Edward D.; and Plachy, William M. Collapsible structures. 4,166,343, Cl. 52-66.000.

Occidental Oil Shale, Inc.: *See—*
Cha, Chang Y., 4,166,721, Cl. 23-230.0EP.

Occidental Petroleum Corporation: *See—*
Duraiswamy, Kandaswamy; and Winter, Bruce L., 4,166,786, Cl. 208-8.00R.

Offer, Robert J.; and Dieringer, James V., to Tenneco Inc. In-line fluid filter. 4,166,792, Cl. 210-131.000.

Ohba, Kenichi; and Narita, Kazutaka, to Hitachi, Ltd. MIS capacitance element. 4,167,018, Cl. 357-51.000.

Ohishi, Kounosuke: *See—*
Ito, Masaru; Murayama, Seiichi; Yamamoto, Manabu; and Ohishi, Kounosuke, 4,166,697, Cl. 356-319.000.

Ohmori, Taiji: *See—*
Okada, Motohiro; and Ohmori, Taiji, 4,166,641, Cl. 280-735.000.

Ohnishi, Fumio: *See—*
Ando, Momofuku; Minami, Junichi; Takatsu, Mitsumune; Ohnishi, Fumio; and Sawada, Makoto, 4,166,868, Cl. 426-441.000.

Ohno, Shigeo: *See—*
Shirasuna, Katuo; Kumo, Ichiro; Kobayashi, Teruo; and Ohno, Shigeo, 4,166,586, Cl. 242-18.0PW.

Oisel, Andre J.: *See—*
Cardot, Claude R.; Democrate, Gerard E.; Droux, Jacques P.; Oisel, Andre J.; and Prival, Guy, 4,166,970, Cl. 318-561.000.

Okada, Motohiro; and Ohmori, Taiji, to Honda Giken Kogyo Kabushiki Kaisha. Inflator for safety air bag in an automotive vehicle. 4,166,641, Cl. 280-735.000.

Okada, Osamu; and Yamamoto, Shunji, to Minolta Camera Kabushiki Kaisha. Protection and safety device for a photocopying machine. 4,166,692, Cl. 355-14.000.

Okamoto, Toyoo; and Miyakawa, Seiichi, to Ricoh Company, Ltd. Device for detecting a toner concentration in a developing solution. 4,166,702, Cl. 356-440.000.

Okuda, Hiroji; and Imada, Akira, to Koyo Seiko Company Limited. Universal joint. 4,166,366, Cl. 64-17.0SP.

Okunishi, Hiromu; Nakaji, Hideki; Suwa, Hiroyuki; and Sato, Hideaki, to Honda Giken Kogyo Kabushiki Kaisha. Stainless steel brake disc structure. 4,166,521, Cl. 188-251.00M.

Olejnizak, Lawrence A.: *See—*
Price, Raymond R.; Olejnizak, Lawrence A.; and Olejnizak, Roger V., 4,166,524, Cl. 193-34.000.

Olejnizak, Roger V.: *See—*
Price, Raymond R.; Olejnizak, Lawrence A.; and Olejnizak, Roger V., 4,166,524, Cl. 193-34.000.

Olin Corporation: *See—*
Kadija, Igor V.; and Woodard, Kenneth E., Jr., 4,166,785, Cl. 204-296.000.

Oliver, Don W.; and Dale, John L., to Buckeye Cellulose Corporation, The. Surgical drape. 4,166,461, Cl. 128-132.00D.

Olympus Optical Co., Ltd.: *See—*
Hashimoto, Akihiko, 4,166,685, Cl. 354-231.000.
Maitani, Yoshihisa, 4,166,680, Cl. 354-126.000.
Tojyo, Tsutomu, 4,166,674, Cl. 350-175.0ML.

Orfeo, Sabatino R.: *See—*
Mastroianni, Martin J.; Orfeo, Sabatino R.; and Sukornick, Bernard, 4,166,798, Cl. 252-63.500.

Oronzio de Nora Impianti Elettrochimici S.p.A.: *See—*
Bianchi, Giuseppe; De Nora, Oronzio; and Spaziante, Placido M., 4,166,780, Cl. 204-99.000.

Ortabasi, Ugur: *See—*
Dorfeld, William G.; and Ortabasi, Ugur, 4,166,917, Cl. 136-89.0CA.

Orths, Kurt: *See—*
Berger, Peter; Lampic, Milan; Muller, Jorg; and Orths, Kurt, 4,166,378, Cl. 73-15.00B.

Ostertog, Robert J.: *See—*
Sterrett, Robert W.; Shu, Larry S.; and Ostertog, Robert J., 4,166,749, Cl. 106-93.000.

Otis Engineering Corporation: *See—*
Gano, John C., 4,166,475, Cl. 137-68.00R.

Otto Kuhlmann GmbH & Co.: *See—*
Pfeiffer, Herbert, 4,166,492, Cl. 152-362.00R.

Ouchi, Hideo: *See—*
Chiba, Moichi; Ouchi, Hideo; and Suzuki, Toshio, 4,166,662, Cl. 308-235.000.

Overby, Clarence W.: *See—*
Barger, John J.; and Overby, Clarence W., 4,166,940, Cl. 219-74.000.

Owen, Geoffrey R.: *See—*
Durant, Graham J.; Ganellin, Charon R.; Owen, Geoffrey R.; and Young, Rodney C., 4,166,856, Cl. 424-270.000.

Owens-Corning Fiberglas Corporation: *See—*
Karpik, Richard H.; and Griffiths, David H., 4,166,872, Cl. 428-35.000.
Marzocchi, Alfred; Roberts, Michael G.; and Bolen, Charles E., 4,166,752, Cl. 106-273.00N.
Warner, Kenneth N., Jr., 4,166,896, Cl. 528-301.000.

Ownby, James C.: *See—*
Irick, Gether, Jr.; Ownby, James C.; and Wang, Richard H. S., 4,166,803, Cl. 252-402.000.

Ozawa, Miya: *See—*
Mitsui, Hisashi, 4,166,847, Cl. 424-180.000.

Package Exhibit Programs, Inc.: *See—*
Donovan, John E., 4,166,332, Cl. 40-605.000.

Palmer, Ansell W.: *See—*
Germer, Warren R.; and Palmer, Ansell W., 4,166,975, Cl. 324-116.000.

Paoletti, Rodolfo: *See—*
Ferruti, Paolo; and Paoletti, Rodolfo, 4,166,902, Cl. 536-48.000.

Pape, Hermann: *See—*
Schmitz, Rudolf; Pape, Hermann; and Stoecker, Hans, 4,166,308, Cl. 24-84.00R.

Papp, Istvan: *See—*
Heller, Laszlo; Forgo, Laszlo; Papp, Istvan; Bodas, Janos; Agejev, Georgij S.; Alekszejev, Ivan A.; and Minaszjan, Ruben G., 4,166,339, Cl. 47-17.000.

Paschke, Edward E.: *See—*
Gilliam, Kenneth D.; and Paschke, Edward E., 4,166,873, Cl. 428-35.000.

Passinos, Bill: *See—*
Earnest, Ernest R.; and Passinos, Bill, 4,166,361, Cl. 60-39.18R.

Pate, Kevin T.; and Timm, Edward E., to Dow Chemical Company, The. Non-adiabatic reaction calorimetric technique. 4,166,385, Cl. 73-190.00R.

Patel, Parbhubhai D., to Bell Telephone Laboratories, Incorporated. Heat dissipating assembly for semiconductor devices. 4,167,031, Cl. 361-388.000.

Patel, Rashmikant R.: *See—*
Kay, Daniel J.; and Patel, Rashmikant R., 4,166,644, Cl. 282-27.500.

Patton, Ray F.: *See—*
Fono, Andrew; and Patton, Ray F., 4,166,717, Cl. 8-38.000.

Pavlov, Alexandr F.: *See—*
Stepantsov, Georgy K.; Abramov, Valentin S.; Bloschitsyn, Jury N.; Zaripov, Raif R.; Babko, Alexandr A.; Kutlin, Ferdinand K.; Glazunov, Ivan V.; Nilov, Alexei A.; Kuznetsov, Gennady V.; Viter, Petr A.; Pavlov, Alexandr F.; Belonog, Valery M.; Korneev, Vladimir A.; and Zvereva, Emilia I., 4,166,375, Cl. 72-430.000.

Peaks, David F.: *See—*
Alford, Peter B.; and Peaks, David F., 4,166,585, Cl. 241-275.000.

Pearson, Raymond H. Deodorizer for toilets. 4,166,298, Cl. 4-213.000.

Pecker, Guillermo E.; and Slack, Douglas J., to Texas Instruments Incorporated. Thermostatic snap switch. 4,166,995, Cl. 337-390.000.

Peek, Henry L. Drive for high speed disconnect switch. 4,166,938, Cl. 200-153.00G.

Pennwalt Corporation: *See—*
Nilsen, Carl G.; and Gabel, Richard A., 4,166,602, Cl. 248-280.100.

Perjes, Raymond. Pipe hangers. 4,166,600, Cl. 248-59.000.

Perry, Francis J.: *See—*
Darling, Richard H.; and Perry, Francis J., 4,167,014, Cl. 346-75.000.

Petersen, Paul S. Auto economy gauge. 4,166,382, Cl. 73-115.000.

Petersen, Thorvald K.: *See—*
Seifert, Clair F.; Seapy, Harvey S.; and Petersen, Thorvald K., 4,166,597, Cl. 244-160.000.

Peyraud, Dominique; and Voumard, Martial, to Societe Suisse pour l'Industrie Horlogere Management Services, S.A. Transfer machine for sealing electronic or like components under vacuum. 4,166,563, Cl. 228-47.000.

Pfeiffer, Herbert, to Otto Kuhlmann GmbH & Co. Method of producing an annular bead core assembly for a pneumatic tire. 4,166,492, Cl. 152-362.00R.

Pfizer Inc.: *See—*
Bright, Gene M., 4,166,901, Cl. 536-9.000.

Pharmacia Fine Chemicals: *See—*
Nordlund, Lage A., 4,166,483, Cl. 141-1.000.

Philip Morris Incorporated: *See—*
Lilly, A. Clifton, Jr.; Watson, Francis M., III; Martin, Peter; and Price, John S., 4,166,973, Cl. 324-58.50B.

Phillip Petroleum Company: *See—*
Haskell, Donald M.; Hower, Clarence G.; and Sherk, Fred T., 4,166,771, Cl. 203-58.000.

Phillips Petroleum Company: *See—*
Anderson, John E.; and Funk, Gary L., 4,166,770, Cl. 203-2.000.
Geissler, Bernhard H.; and Hann, Paul D., 4,166,722, Cl. 23-314.000.
Janzen, Jay, 4,166,950, Cl. 250-231.00R.
McKay, Dwight L.; and Bertus, Brent J., 4,166,806, Cl. 252-437.000.
Murtha, Timothy P., 4,166,772, Cl. 203-60.000.
Williams, Ralph P., 4,166,815, Cl. 260-45.75S.

Phillips, Raymond J.; and Susi, Anthony R., to United States of America, Navy. Flexible housing, in-line electronic. 4,166,921, Cl. 174-70.00S.

Phipps, Jack R.: *See*—
Helava, Uuno V.; and Phipps, Jack R., 4,166,440, Cl. 123-117.00R.
Pickering & Company: *See*—
Frielingsdorf, Frank J., 4,166,625, Cl. 274-23.00R.
Pickering, John F., to Girling Limited. Reservoirs for liquids. 4,166,431, Cl. 116-227.000.
Pignons S.A.: *See*—
Rochat, Charles L., 4,166,696, Cl. 356-223.000.
Pike, Edward R.: *See*—
Hill, David W.; and Pike, Edward R., 4,166,695, Cl. 356-28.000.
Pikel, John H., to Allegheny Ludlum Industries, Inc. Rendering apparatus. 4,166,836, Cl. 422-308.000.
Pilgram, Kurt H. G.; and Skiles, Richard D., to Shell Oil Company. Cycloalkanecarboxanilide derivative herbicides. 4,166,735, Cl. 71-118.000.
Pinto de Novais Paiva, Manuel. Process for separating substances of different masses. 4,166,727, Cl. 55-17.000.
Pixyfoto GmbH: *See*—
Viering, Rudolf, 4,166,687, Cl. 354-290.000.
Plachy, William M.: *See*—
O'Brian, Edward D.; and Plachy, William M., 4,166,343, Cl. 52-66.000.
Plastic Forming Company, Inc., The: *See*—
Schurman, Peter T., 4,166,833, Cl. 264-540.000.
Plattner, Jacob J.; Voss, Houston F.; and Magic, Susan E., to Abbott Laboratories. Chromogenic substrates. 4,166,825, Cl. 260-455.00R.
Plaubel, Feinmechanik & Optik GmbH: *See*—
Schrader, Goetz, 4,166,678, Cl. 354-23.00R.
Schrader, Goetz, 4,166,682, Cl. 354-187.000.
Schrader, Goetz, 4,166,686, Cl. 354-266.000.
Pleger, Johannes; and Preuss, Manfred, to Waggon Union GmbH. Railway bogie emergency run guide assembly. 4,166,420, Cl. 105-224.00R.
Plessers, Jacques J., to Electro-Nite Co. Method for the treatment of nodular or vermicular cast iron samples. 4,166,738, Cl. 75-130.00R.
Plessey Handel und Investments AG: *See*—
Elwell, Stephen J., 4,166,577, Cl. 239-102.000.
Hall, Samuel S.; and Caves, Francis J., 4,166,605, Cl. 251-129.000.
Heritier, Francis R.; and Iles, Christopher W., 4,167,040, Cl. 364-900.000.
Plichta, Zdenek: *See*—
Bleha, Miroslav; Plichta, Zdenek; Votavova, Eva; and Kalal, Jaroslav, 4,166,804, Cl. 252-408.000.
Pluenneke, Ricks H. Pot lining method with reclaimed tire fibers. 4,166,340, Cl. 47-58.000.
Pohlman, Joe C.; and Romualdi, James P. Composite structural member and method of constructing same. 4,166,347, Cl. 52-223.00R.
Polaroid Corporation: *See*—
Idelson, Elbert M., 4,166,741, Cl. 96-77.000.
Schuler, Norman W., 4,166,871, Cl. 427-163.000.
Pold, Jaan; and Wettersten, Karl-Bertil W., to Hugin Kassaregister Aktiebolag. Apparatus for identifying and registering bottles. 4,166,949, Cl. 250-223.00B.
Polysar Resins, Inc.: *See*—
Crisci, Victor E., 4,166,548, Cl. 220-308.000.
Poque, Dionysius J., to Uniroyal GmbH. Pneumatic radial tire. 4,166,490, Cl. 152-209.00R.
Porter, Robert E. Top feed for sewing machine. 4,166,422, Cl. 112-311.000.
Portier, Claude: *See*—
Duthion, Louis; Sagner, Max; and Portier, Claude, 4,166,477, Cl. 137-604.000.
Post Office, The: *See*—
White, Brian R.; and Smith, David R., 4,166,985, Cl. 331-94.50S.
Potter, Robert T.: *See*—
Kosicki, Witold W.; Corris, Charles J.; and Potter, Robert T., 4,166,337, Cl. 46-232.000.
PPG Industries, Inc.: *See*—
Das, Suryya K.; and Kania, Charles M., 4,166,882, Cl. 428-463.000.
Neely, Homer E., Jr., 4,166,747, Cl. 106-50.000.
Preuss, Manfred: *See*—
Pleger, Johannes; and Preuss, Manfred, 4,166,420, Cl. 105-224.00R.
Price, John S.: *See*—
Lilly, A. Clifton, Jr.; Watson, Francis M., III; Martin, Peter; and Price, John S., 4,166,973, Cl. 324-58.50B.
Price, Raymond R.; Olejnizak, Lawrence A.; and Olejnizak, Roger V., to Rochester Silo, Inc. Closure for silo dormer. 4,166,524, Cl. 193-34.000.
Prittie, Robert N., to Lear Siegler, Inc. Electrically isolated brush holder. 4,166,968, Cl. 310-239.000.
Prival, Guy: *See*—
Cardot, Claude R.; Democrate, Gerard E.; Droux, Jacques P.; Oisel, Andre J.; and Prival, Guy, 4,166,970, Cl. 318-561.000.
Procter & Gamble Company: *See*—
Stiros, Paul, 4,166,551, Cl. 221-51.000.
Produits Chimiques Ugine Kuhlmann: *See*—
Koeppel, Robert, 4,166,750, Cl. 106-109.000.
Loiseau, Gerard P. M. H.; Mattioda, Georges D.; Millischer, Rene J.; and Obellianne, Pierre M. J., 4,166,852, Cl. 424-251.000.
Projectus Industriprodukter Aktiebolag: *See*—
Gustafsson, Berth U., 4,166,305, Cl. 15-302.000.
Propper Manufacturing Co., Inc.: *See*—
Heine, Helmut A.; and Rosenbusch, Helmut, 4,166,677, Cl. 351-16.000.
Proulx, Edward A.: *See*—
Wetzel, Lewis K.; and Proulx, Edward A., 4,166,408, Cl. 89-33.00D.
Pruitt, Martin E.: *See*—
Garrison, Harold K.; and Pruitt, Martin E., 4,166,353, Cl. 56-377.000.
Ptaszek, George W.: *See*—
Sullivan, Paul J.; Behling, Fredric C.; and Ptaszek, George W., 4,166,630, Cl. 280-87.02R.
PTX-Pentronix, Inc.: *See*—
DeSantis, Raymond P., 4,166,716, Cl. 425-78.000.
Pugin, Andre: *See*—
Reinert, Gerhard; Holzle, Gerd; and Pugin, Andre, 4,166,718, Cl. 8-111.000.
Putter, Rolf: *See*—
Schossler, Willi; Putter, Rolf; and Behre, Horst, 4,166,826, Cl. 260-509.000.
Pye Limited: *See*—
Bradshaw, Robert F. D., 4,166,379, Cl. 73-23.000.
Radzai, Roy R.: *See*—
Horning, John E.; Radzai, Roy R.; and Hagstrom, John R., 4,166,694, Cl. 355-77.000.
Rager, Edgar A. Centering collar for a disk hub. 4,166,622, Cl. 274-1.00R.
Ragle, Herbert U.; and DeMoss, Dean, to Burroughs Corporation. Jet distributor for end-wise pneumatic partitioning of disk pack. 4,167,029, Cl. 360-99.000.
Ralston Purina Company: *See*—
Betz, Norman L.; Lanter, Kent J.; Breuer, Leslie H.; and Steinke, Frederick H., 4,166,867, Cl. 426-73.000.
Ramsay, Melvin M., to International Standard Electric Corporation. Optical fiber cable. 4,166,670, Cl. 350-96.230.
Rao, Baskara M. L.; and Malachesky, Paul A., to Exxon Research & Engineering Co. Cell having an alkali metal anode, a fluorinated carbon cathode and an electrolyte which includes an alkali metal halide salt and a solvent system containing a substituted amide solvent and a cyclic carbonate cosolvent. 4,166,888, Cl. 429-194.000.
Rasquin, Werner: *See*—
Friedrich, Jurgen; Brakelmann, Heinrich; and Rasquin, Werner, 4,166,920, Cl. 174-15.00C.
Raychem Corporation: *See*—
Brooks, Peter L., 4,166,739, Cl. 75-157.500.
Rayfield, Wilson P., to Burroughs Corporation. Indexing rotary actuator with energy storage and linkage locking means. 4,166,402, Cl. 74-822.000.
RCA Corporation: *See*—
Ahmed, Adel A. A., 4,166,964, Cl. 307-296.00R.
Bessette, Oliver E.; and Griffin, James S., 4,167,023, Cl. 358-127.000.
Carlson, David E., 4,166,919, Cl. 136-89.0CL.
Curtice, Walter R., 4,166,965, Cl. 307-299.00R.
Dischert, Robert A.; and Thorpe, Laurence J., 4,167,022, Cl. 358-41.000.
Hanak, Joseph J., 4,167,015, Cl. 357-16.000.
Holmes, David D., 4,167,020, Cl. 358-36.000.
Holmes, David D., 4,167,021, Cl. 358-36.000.
Nostrand, Gerald E.; and Hanak, Joseph J., 4,166,918, Cl. 136-89.00R.
Willis, Donald H., 4,167,025, Cl. 358-243.000.
Recchuite, Alexander D., to Suntech, Inc. Chemical reaction product of sulfur, lard oil and polyisobutylene. 4,166,795, Cl. 252-48.600.
Recchuite, Alexander D., to Suntech, Inc. Composition comprising a cosulfurized blend of lard oil and an olefin. 4,166,796, Cl. 252-48.600.
Recchuite, Alexander D., to Suntech, Inc. Oil containing a consulfurized olefin-triglyceride blend. 4,166,797, Cl. 252-48.600.
Recortec, Inc.: *See*—
Tobey, Richard, 4,167,028, Cl. 360-72.200.
Redner, Raymond, III: *See*—
Brandon, Ralph E.; Ring, Michael; and Redner, Raymond, III, 4,166,877, Cl. 428-221.000.
Reed, Robert D.; and Martin, Richard R., to John Zink Company. Air injector nozzle for secondary reformer. 4,166,834, Cl. 422-148.000.
Reed, Thomas F., to General Tire & Rubber Company, The. Method and apparatus for mixing gases in a closed chamber. 4,166,484, Cl. 141-4.000.
Reese, George F. Connector. 4,166,666, Cl. 339-118.00R.
Regan, Michael T.: *See*—
Webster, Frank G.; and Regan, Michael T., 4,166,740, Cl. 96-1.0PE.
Regie Nationale des Usines Renault: *See*—
Menard, Michel; Cherbourg, Robert; and Falluel, Jean P., 4,166,646, Cl. 292-336.300.
Rehage, Ted A.: *See*—
Curlander, Paul J.; and Rehage, Ted A., 4,167,041, Cl. 364-900.000.
Reichhold Chemicals Limited: *See*—
Kambanis, Stamatis M.; Roberts, Alan D.; and Schank, Walter, 4,166,893, Cl. 526-75.000.
Reid, F. Joseph: *See*—
Rhodes, William H.; and Reid, F. Joseph, 4,166,831, Cl. 264-1.000.
Reid, George J.: *See*—
Hoover, Lawrence E.; and Reid, George J., 4,166,589, Cl. 242-75.400.
Reinert, Gerhard; Holzle, Gerd; and Pugin, Andre, to Ciba-Geigy Corporation. Process for bleaching textiles. 4,166,718, Cl. 8-111.000.

Rekewitz, Rudolf; and Kuelzer, Peter, to Siemens Aktiengesellschaft. Magnetically actuated needle printing head and method of manufacture. 4,166,314, Cl. 29-517.000.

Renner, Elmer J., to Stephens-Adamson, Inc. Longitudinal support for a conveyor belt. 4,166,528, Cl. 198-825.000.

Renton, Stanley, to Albright & Wilson Limited. Testing of aqueous solutions. 4,166,719, Cl. 23-230.00R.

Research Technology, Inc.: *See—*
Bowen, Howard; Henderson, Dave; and Little, Steve, 4,166,700, Cl. 356-381.000.

Rhodes, William H.; and Reid, F. Joseph, to GTE Laboratories Incorporated. Transparent yttria ceramics and method for producing same. 4,166,831, Cl. 264-1.000.

Rhone-Poulenc Industries: *See—*
Daumas, Jean-Claude; Derrien, Jean-Yves; and Van den Bussche, Francis, 4,166,808, Cl. 252-455.00R.

Rice, Robert D.: *See—*
Beise, Theodore W.; and Rice, Robert D., 4,166,579, Cl. 239-526.000.

Richardson, Kenneth, to Memoriser Limited. Notepad attachment. 4,166,559, Cl. 224-276.000.

Richter, George N.: *See—*
Slater, William L.; and Richter, George N., 4,166,802, Cl. 252-373.000.

Ricoh Company, Ltd.: *See—*
Ebi, Yutaka; Hirata, Tositaka; Kato, Toshifumi; and Ikezu, Yohei, 4,166,691, Cl. 355-11.000.
Okamoto, Toyoo; and Miyakawa, Seiichi, 4,166,702, Cl. 356-440.000.

Rienass, Rainer; Buscher, Enno; and Jansing, Walter, to Interatom, International Atomreaktorbau G.m.b.H. Electromagnetic pump. 4,166,714, Cl. 417-50.000.

Riggi, Dan: *See—*
Farris, Darrel D.; and Riggi, Dan, 4,166,481, Cl. 141-1.000.

Rimar Meccanica S.p.A.: *See—*
Beninca', Marcello; and Lora, Mario, 4,166,368, Cl. 68-20.000.

Ring, Michael: *See—*
Brandon, Ralph E.; Ring, Michael; and Redner, Raymond, III, 4,166,877, Cl. 428-221.000.

Risbec, Andre: *See—*
Lazerand, Jean; and Risbec, Andre, 4,166,570, Cl. 229-52.00B.

Ritter, Arthur J., Jr.: *See—*
Hedgcock, Richard L.; and Ritter, Arthur J., Jr., 4,166,661, Cl. 308-207.00R.

Roaldsnes, Leiv: *See—*
Martinussen, Svein; Roaldsnes, Leiv; and Roed, Harald, 4,166,545, Cl. 414-139.000.

Robert Bosch GmbH: *See—*
Bianchi, Valerio; Latsch, Reinhard; and Schmidt, Peter-Jurgen, 4,166,437, Cl. 123-32.0EC.
Glauert, Wolfram; and Klinger, Helmut, 4,166,977, Cl. 324-173.000.
Hamisch, Hansjoachim, 4,167,024, Cl. 358-128.000.
Wittlinger, Karl F.; and Issler, Jorg, 4,166,966, Cl. 310-111.000.

Roberts, Alan D.: *See—*
Kambanis, Stamatis M.; Roberts, Alan D.; and Schank, Walter, 4,166,893, Cl. 526-75.000.

Roberts, Michael G.: *See—*
Marzocchi, Alfred; Roberts, Michael G.; and Bolen, Charles E., 4,166,752, Cl. 106-273.00N.

Roberts, Robert; and Chapman, Frank M., to Carborundum Company, The. Corrosive chemical containment system. 4,166,536, Cl. 206-524.300.

Robertson, Victor J.: *See—*
Allen, Robert H.; and Robertson, Victor J., 4,166,539, Cl. 206-629.000.

Robinson, Charles H. Bowling ball storage and transportation apparatus. 4,166,530, Cl. 206-315.00B.

Rochat, Charles L., to Pignons S.A. Photometer. 4,166,696, Cl. 356-223.000.

Rochester Silo, Inc.: *See—*
Price, Raymond R.; Olejnizak, Lawrence A.; and Olejnizak, Roger V., 4,166,524, Cl. 193-34.000.

Rock, Erich; and Mages, Bernhard, to Julius Gesellschaft m.b.H. Hinge. 4,166,307, Cl. 16-163.000.

Rockwell International Corporation: *See—*
Flanagan, Joseph E., 4,166,843, Cl. 423-648.00R.
Jenkins, James R., 4,166,984, Cl. 331-1.00A.
Kirsch, Milton; and Melvold, Robert W., 4,166,703, Cl. 356-442.000.
Rothe, Kurt; Furst, Raymond B.; and Nielson, Charles E., 4,166,310, Cl. 29-23.500.
Warrick, Edward C.; and Davis, Michael, 4,166,386, Cl. 73-194.00R.

Roed, Harald: *See—*
Martinussen, Svein; Roaldsnes, Leiv; and Roed, Harald, 4,166,545, Cl. 414-139.000.

Roessler, Barton: *See—*
Loferski, Joseph J.; and Roessler, Barton, 4,166,880, Cl. 428-457.000.

Rogers, Norman H.: *See—*
Luk, Kong; Clayton, John P.; and Rogers, Norman H., 4,166,863, Cl. 424-283.000.

Rogers, Richard B.: *See—*
Carson, Chrislyn M.; Ehr, Robert J.; and Rogers, Richard B., 4,166,854, Cl. 424-263.000.

Rollwitz, William L.: *See—*
King, James D.; Matzkanin, George A.; and Rollwitz, William L., 4,166,972, Cl. 324-0.5AC.

Romanzi, Louis J.: *See—*
Barcus, Edward L.; and Romanzi, Louis J., 4,166,592, Cl. 242-107.40A.

Romualdi, James P.: *See—*
Pohlman, Joe C.; and Romualdi, James P., 4,166,347, Cl. 52-223.00R.

Rosenberg, Edward D., to New Hermes, Incorporated. Illuminated engraving machine. 4,166,319, Cl. 33-24.00B.

Rosenbusch, Helmut: *See—*
Heine, Helmut A.; and Rosenbusch, Helmut, 4,166,677, Cl. 351-16.000.

Ross, William J.; Verge, John P.; and Williamson, William R. N., to Lilly Industries Limited. Acylamino derivatives. 4,166,818, Cl. 548-128.000.

Rosso, Michele. Air pressure gauge. 4,166,397, Cl. 73-744.000.

Rothe, Kurt; Furst, Raymond B.; and Nielson, Charles E., to Rockwell International Corporation. Method of altering an axial impeller/stator vane combination. 4,166,310, Cl. 29-23.500.

Rovnyak, Richard M., to GTE Automatic Electric Laboratories Incorporated. Transient free ring relay circuit for arbitrary time switching. 4,166,930, Cl. 179-18.0HB.

Rowlands, Dewi T., to Burroughs Wellcome Co. Method and composition for treating fluke infections. 4,166,858, Cl. 424-273.00B.

Roy, Colin: *See—*
Wykes, Robert D.; and Roy, Colin, 4,166,526, Cl. 198-458.000.

Royce Chemical Company: *See—*
Fono, Andrew; and Patton, Ray F., 4,166,717, Cl. 8-38.000.

Ruckstuhl, Konrad. Hammermill. 4,166,583, Cl. 241-73.000.

Rudbach, Michael: *See—*
Schutz, Udo; Rudbach, Michael; and Breuer, Bernd, 4,166,549, Cl. 220-319.000.

Ruhnau, Gerhard; and Gudat, Wolfgang, to WABCO Westinghouse GmbH. Circuit for the digital measurement of the speed of a moving object. 4,166,976, Cl. 324-166.000.

Rupprath, Hans F.: *See—*
Schiron, Klaus; and Rupprath, Hans F., 4,166,295, Cl. 4-172.000.

Ruprecht, David R.; and Lovette, Norris G., to Air Products and Chemicals, Inc. Carbon dioxide snow hood. 4,166,364, Cl. 62-384.000.

Ruti Machinery Works Limited: *See—*
Muller, Walter, 4,166,480, Cl. 139-54.000.

Rydzik, Rachelle M.: *See—*
Gallacher, Lawrence V.; and Rydzik, Rachelle M., 4,166,837, Cl. 423-24.000.

Sabon, Robert J., to GTE Automatic Electric Laboratories Incorporated. Loop, dial pulse and ring trip detection circuit. 4,166,928, Cl. 179-18.0FA.

Sachs, Emanuel M. Automatic photographic film processor and fluid-tight seals therefor. 4,166,688, Cl. 354-319.000.

Safe-T-Lawn, Inc.: *See—*
Harrison, Richard J., 4,166,576, Cl. 239-11.000.

Saft-Societe des Accumulateurs Fixes et de Traction: *See—*
Bonnaterre, Raymond, 4,166,886, Cl. 429-60.000.

Sagner, Max: *See—*
Duthion, Louis; Sagner, Max; and Portier, Claude, 4,166,477, Cl. 137-604.000.

Sahara, Masayoshi: *See—*
Matsuda, Motonobu; Sahara, Masayoshi; and Ishida, Tokuji, 4,166,679, Cl. 354-60.00R.

Sailer, Gunther: *See—*
Schausberger, Helmut; Bruckl, Konrad; and Sailer, Gunther, 4,166,689, Cl. 354-321.000.

Sakamoto, Koji; Asano, Takeshi; Mizuochi, Kazuo; Sasaki, Kanemichi; and Hasegawa, Kouji, to Chugai Seiyaku Kabushiki Kaisha; and Nippon Kayaku Kabushiki Kaisha. Macrotetrolide animal growth promotor. 4,166,865, Cl. 424-285.000.

Saleeby, Edward W. Bathtub safety chair. 4,166,297, Cl. 4-185.00S.

Salera, Edmond A. Heat sensing instrument probe. 4,166,451, Cl. 128-736.000.

Salomon, Georges P. J., to Etablissements Francois Salomon et Fils. Device for holding a boot to a sports article. 4,166,635, Cl. 280-625.000.

Salomon, Georges P. J., to Etablissements Francois Salomon et Fils. Device for holding a boot to a sports article. 4,166,637, Cl. 280-625.000.

Sambe, Yusuke; and Kanoi, Nobuo, to Aiwa Co., Ltd. Information reproducing and recording apparatus for recording on tape from a phonograph record. 4,167,026, Cl. 360-15.000.

Sanaski, David E. Sports wheelchair. 4,166,631, Cl. 280-242.0WC.

Sanders Associates, Inc.: *See—*
Apostolos, John T.; and Boland, Robert P., 4,166,980, Cl. 325-363.000.

Sanders, James M.; Vinals, Joaquin F.; and Schmitt, Frederick L., to International Flavors & Fragrances Inc. Substituted bicyclooctenemethanols. 4,166,916, Cl. 568-820.000.

Sanders, James R., to Union Camp Corporation. Lubricated valve bag and method of lubricating valve spout. 4,166,482, Cl. 141-1.000.

Sando Iron Works Co., Ltd.: *See—*
Sando, Yoshikazu; and Ishidoshiro, Hiroshi, 4,166,367, Cl. 68-9.000.

Sando, Yoshikazu; and Ishidoshiro, Hiroshi, to Sando Iron Works Co., Ltd. Continuous mercerizing apparatus for circular knitted articles. 4,166,367, Cl. 68-9.000.

Sandor, Joseph; and Davis, Claude P., to California Sounds, Ltd. Record cleaner. 4,166,626, Cl. 274-47.000.

Sandoz, Inc.: *See—*
Fong, Jones W., 4,166,800, Cl. 252-316.000.
Sankyo Company Ltd.: *See—*
Soma, Nobuo; Morimura, Syoji; Yoshioka, Takao; and Kurumada, Tomoyuki, 4,166,813, Cl. 260-45.80N.
Santa Fe International Corporation: *See—*
Lloyd, Samuel H., III, 4,166,426, Cl. 114-65.00R.
Santuccio, Benjamin. Photographic apparatus and method. 4,166,693, Cl. 355-61.000.
Sanyo Chemical Industries, Ltd.: *See—*
Fujii, Toshikazu; and Nakamura, Kenji, 4,166,889, Cl. 521-55.000.
Sanyo Electric Co., Ltd.: *See—*
Fujiwara, Hirofumi, 4,166,531, Cl. 206-320.000.
Hashimoto, Hiroyoshi, 4,167,027, Cl. 360-37.000.
Sasaki, Kanemichi: *See—*
Sakamoto, Koji; Asano, Takeshi; Mizuochi, Kazuo; Sasaki, Kanemichi; and Hasegawa, Kouji, 4,166,865, Cl. 424-285.000.
Sassi, Kari, to Konejukka Oy. Hot and cold water supply for mixing valves. 4,166,575, Cl. 236-12.00R.
Sato, Hideaki: *See—*
Okunishi, Hiromu; Nakaji, Hideki; Suwa, Hiroyuki; and Sato, Hideaki, 4,166,521, Cl. 188-251.00M.
Saunders, Charles A., IV. Breakaway handlebar-mounted motorcycle fairing. 4,166,650, Cl. 296-78.100.
Savich, Peter P., to Smyth Manufacturing Compang, The. Apparatus for making integrated book lining. 4,166,300, Cl. 11-1.0AD.
Sawada, Makoto: *See—*
Ando, Momofuku; Minami, Junichi; Takatsu, Mitsumune; Ohnishi, Fumio; and Sawada, Makoto, 4,166,868, Cl. 426-441.000.
Scagnelli, Henry J., to Bell Telephone Laboratories, Incorporated. Alignment apparatus for circuit card mountings. 4,167,032, Cl. 361-415.000.
Schank, Walter: *See—*
Kambanis, Stamatis M.; Roberts, Alan D.; and Schank, Walter, 4,166,893, Cl. 526-75.000.
Schaper, Raymond J., to Calgon Corporation. Functional innene compositions and their use. 4,166,894, Cl. 528-271.000.
Schausberger, Helmut; Bruckl, Konrad; and Sailer, Gunther, to AGFA-Gevaert, A.G. Apparatus for wet treatment of carriers of photosensitive material. 4,166,689, Cl. 354-321.000.
Scheel, Wolfgang; Berns, Reiner; and Heinen, Wolfgang, to Deutsche Solvay-Werke GmbH. Process and device for cleaning cathode surfaces. 4,166,754, Cl. 134-24.000.
Schelle, Charles J. Jack attachment and method of transmission removal. 4,166,608, Cl. 254-133.00R.
Schenck, Arthur J.; and Krause, Richard H., to Bethlehem Steel Corporation. Apparatus for detecting plural repetitive signals. 4,167,004, Cl. 340-679.000.
Schenk, Peter, to Dzus Fastener Co., Inc. Variable height receptacle. 4,166,309, Cl. 24-221.00R.
Scheurenbrand, Dieter: *See—*
Kleinschmit, Einhard; and Scheurenbrand, Dieter, 4,166,550, Cl. 220-85.0VR.
Schillings, Dieter: *See—*
Geers, Leo; Muskens, Peter; and Schillings, Dieter, 4,166,611, Cl. 267-3.000.
Schiron, Klaus; and Rupprath, Hans F. Swimming bath with bath dividers. 4,166,295, Cl. 4-172.000.
Schlosser, Paul W., to Bleiweiss, Edward. Pneumatic motor. 4,166,410, Cl. 91-50.000.
Schlumberger Technology Corporation: *See—*
Bernard, James I.; and Strom, Gerald A., 4,167,000, Cl. 367-84.0LD.
Waggener, William N., 4,166,979, Cl. 325-321.000.
Schmidt, Adolf G. Apparatus for positioning heavy rolls and the like. 4,166,647, Cl. 294-78.00A.
Schmidt, Peter-Jurgen: *See—*
Bianchi, Valerio; Latsch, Reinhard; and Schmidt, Peter-Jurgen, 4,166,437, Cl. 123-32.0EC.
Schmitt, Frederick L.: *See—*
Sanders, James M.; Vinals, Joaquin F.; and Schmitt, Frederick L., 4,166,916, Cl. 568-820.000.
Schmitz, Rudolf; Pape, Hermann; and Stoecker, Hans, to Gardisette Holding AG. Fold or pleat fixing arrangement for curtains or drapes. 4,166,308, Cl. 24-84.00R.
Schneider, Herbert A., to Bell Telephone Laboratories, Incorporated. Current mirror arrays. 4,166,971, Cl. 323-4.000.
Schnitzius, Klaus: *See—*
Freitag, Herbert; and Schnitzius, Klaus, 4,166,612, Cl. 267-65.00R.
Scholl, Herbert, to Scholl, Herbert. Device for removing workpieces from a container. 4,166,649, Cl. 294-65.500.
Schossler, Willi; Putter, Rolf; and Behre, Horst, to Bayer Aktiengesellschaft. Process for the preparation of 1-amino-8-naphthol-3,6-disulphonic acid (H-acid). 4,166,826, Cl. 260-509.000.
Schrader, Goetz, to Plaubel, Feinmechanik & Optik GmbH. Light shield for photometer-equipped camera. 4,166,678, Cl. 354-23.00R.
Schrader, Goetz, to Plaubel, Feinmechanik & Optik GmbH. Viewfinder for collapsible camera. 4,166,682, Cl. 354-187.000.
Schrader, Goetz, to Plaubel, Feinmechanik & Optik GmbH. Shutter-control mechanism for photographic camera. 4,166,686, Cl. 354-266.000.
Schramm, Chris. Educational teaching aid. 4,166,326, Cl. 35-9.00A.
Schroeder, Warren E. Infant carrier. 4,166,558, Cl. 224-158.000.
Schubert, Richard M.: *See—*
Esders, Theordore W.; Goodhue, Charles T.; and Schubert, Richard M., 4,166,763, Cl. 435-28.000.
Schubert & Salzer: *See—*
Kiper, Gerd; and Schumann, Dietmar, 4,166,399, Cl. 74-320.000.
Schuierer, Manfred: *See—*
Bruckner, Kurt; and Schuierer, Manfred, 4,166,561, Cl. 226-105.000.
Schuler, Norman W., to Polaroid Corporation. Iodine stained light polarizer. 4,166,871, Cl. 427-163.000.
Schulman, Carl H.: *See—*
DuShane, Ray N.; and Schulman, Carl H., 4,166,299, Cl. 5-18.00R.
Schumann, Dietmar: *See—*
Kiper, Gerd; and Schumann, Dietmar, 4,166,399, Cl. 74-320.000.
Schupphaus, Herbert: *See—*
Oberste-Beulmann, Klaus; Schupphaus, Herbert; Borowski, Karl-Heinz; Lanfermann, Willy; and Henrich, Friedhelm, 4,166,652, Cl. 299-43.000.
Schurman, Peter T., to Plastic Forming Company, Inc., The. Method and apparatus for molding a plastic article. 4,166,833, Cl. 264-540.000.
Schutz, Udo; Rudbach, Michael; and Breuer, Bernd. Wide-necked barrel and lid having fastening means. 4,166,549, Cl. 220-319.000.
Schwartz, Walter, to McDonnell Douglas Corporation. Re-entry chaff. 4,167,009, Cl. 343-18.00B.
Scott, Kenneth W. Water heater control system. 4,166,944, Cl. 219-330.000.
Seapy, Harvey S.: *See—*
Seifert, Clair F.; Seapy, Harvey S.; and Petersen, Thorvald K., 4,166,597, Cl. 244-160.000.
Seifert, Clair F.; Seapy, Harvey S.; and Dunlap, David E., 4,166,598, Cl. 244-160.000.
Sedlatschek, Robert: *See—*
Brienza, Michael J.; Garron, Stephen A.; and Sedlatschek, Robert, 4,166,423, Cl. 112-214.000.
Seiberling, Mildred Kelley. *See—*
Seiberling, Theophilus K., 4,166,883, Cl. 428-495.000.
Seiberling, Theophilus K., [illegible]berling, Mildred Kelley, a part interest. Tires with liners cured by [illegible]diation. 4,166,883, Cl. 428-495.000.
Seifert, Clair F., Seapy, Harvey S.; and Petersen, Thorvald K., to United States of America, Air Force. Stowable and inflatable vehicle. 4,166,597, Cl. 244-160.000.
Seifert, Clair F., Seapy, Harvey S.; and Dunlap, David E., to United States of America, Air Force. Vehicle enshrouding apparatus. 4,166,598, Cl. 244-160.000.
Selway, Peter R., to International Standard Electric Corporation. Optical microphone with rectangular fiber optics. 4,166,932, Cl. 179-121.00R.
Serafini, John: *See—*
Tremblay, Dennis D.; and Serafini, John, 4,166,358, Cl. 58-16.00R.
Seymour, Raymond K.: *See—*
Ciarcia, Ronald D.; and Seymour, Raymond K., 4,166,988, Cl. 335-9.000.
Shadlen, Gerald: *See—*
Casson, Edward A., Jr.; Gaul, Albro T.; Langlais, Eugene L.; Shadlen, Gerald; and Vanaver, Eugene L., 4,166,777, Cl. 204-28.000.
Shaffer, Joseph J.; and Butler, John D., to United States of America, Navy. Toroidal polisher. 4,166,342, Cl. 51-58.000.
Shakespeare Company: *See—*
Shepherd, Bob G., 4,166,591, Cl. 242-84.21A.
Shakespeare of Arkansas, Inc.: *See—*
Kinsey, John O., 4,166,594, Cl. 242-214.000.
Sharp Kabushiki Kaisha: *See—*
Noguchi, Hiroshi; and Kurokawa, Yasuyoshi, 4,166,615, Cl. 271-259.000.
Sheem, Sang K. Missile launching device combined with target. 4,166,618, Cl. 273-96.00R.
Sheinbein, Daniel, to Bell Telephone Laboratories, Incorporated. Inter-office callback arrangement. 4,166,929, Cl. 179-18.0BG.
Shell Coil Company: *See—*
Entwistle, Ian D., 4,166,734, Cl. 71-11[illegible]000.
Shell Oil Company: *See—*
Anderson, Victor F., 4,166,554, Cl. 222-182.000.
Colby, Thomas H.; Freitas, Ernest R.; and Durland, William R., 4,166,909, Cl. 544-204.000.
Pilgram, Kurt H. G.; and Skiles, Richard D., 4,166,735, Cl. 71-118.000.
Shepherd, Bob G., to Shakespeare Company. Level wind for fishing reel. 4,166,591, Cl. 242-84.21A.
Sheppard, John J. Fingertip hockey game. 4,166,620, Cl. 273-126.00R.
Shepperd, David M., to Atari, Inc. Video image generator. 4,167,019, Cl. 358-22.000.
Sherk, Fred T.: *See—*
Haskell, Donald M.; Houser, Clarence G.; and Sherk, Fred T., 4,166,771, Cl. 203-58.000.
Sherwood, William G.: *See—*
Bruckenstein, Stanley; and Sherwood, William G., 4,166,775, Cl. 204-1.00T.
Shibahara, Tetsuya: *See—*
Shigematsu, Taichiro; Kasugai, Hiroshi; Shibahara, Tetsuya; Nakajima, Tetsuo; and Teraoka, Toru, 4,166,846, Cl. 424-81.000.
Shigematsu, Taichiro; Kasugai, Hiroshi; Shibahara, Tetsuya; Nakajima, Tetsuo; and Teraoka, Toru, to Mitsubishi Chemical Industries, Ltd. Chemicals for controlling plant virus diseases and control method. 4,166,846, Cl. 424-81.000.
Shih, Kwang K.: *See—*
Hung, Roland Y.; and Shih, Kwang K., 4,167,016, Cl. 357-17.000.

Shimada, Satoshi: *See*—
Matsuda, Yasumasa; Yamada, Kazuji; Shimada, Satoshi; Nishihara, Motohisa; Yasuda, Tomio; Tsuchiya, Masatoshi; Soeno, Ko; Ai, Mitsuo; Nagata, Takeo; and Matsuoka, Yoshitaka, 4,166,384, Cl. 73-141.00A.

Shimomoto, Tsunemitsu, to Ataka Kogyo Kabushiki Kaisha. Foam eliminating device. 4,166,801, Cl. 252-361.000.

Shinoda, Kenichi: *See*—
Tsuchida, Taketoshi; Shinoda, Kenichi; Yamamoto, Kohei; Ikuma, Fumio; and Tanaka, Yuzo, 4,166,532, Cl. 206-333.000.

Shinsei Kogyo Co., Ltd.: *See*—
Asano, Kiyoji, 4,166,338, Cl. 46-253.000.

Shipman, William H.: *See*—
McCartney, Joseph F.; and Shipman, William H., 4,166,884, Cl. 429-10.000.

Shirasuna, Katuo; Kumo, Ichiro; Kobayashi, Teruo; and Ohno, Shigeo, to Toray Industries, Inc. Yarn winding method and apparatus. 4,166,586, Cl. 242-18.0PW.

Shishido, Tadao: *See*—
Mifune, Hiroyuki; Takada, Shunji; Akimura, Yoshitaka; and Shishido, Tadao, 4,166,742, Cl. 96-107.000.

Shu, Larry S.: *See*—
Sterrett, Robert W.; Shu, Larry S.; and Ostertog, Robert J., 4,166,749, Cl. 106-93.000.

Shum, Yick-Mow: *See*—
Brown, Alfred; Huang, Wann-Sheng; and Shum, Yick-Mow, 4,166,504, Cl. 166-272.000.

Sieler, George J. Portable lectern and voice amplifier. 4,166,926, Cl. 179-1.0AT.

Siemens Aktiengesellschaft: *See*—
Jantsch, Ottomar, 4,166,957, Cl. 250-445.00T.
Rekewitz, Rudolf; and Kuelzer, Peter, 4,166,314, Cl. 29-517.000.

Sietz, Fritz G., to Thomas J. Lipton, Inc. Process for purifying phosphatides. 4,166,823, Cl. 260-403.000.

Sifniades, Stylianos: *See*—
Tunick, Allen A.; Koff, Fred W.; and Sifniades, Stylianos, 4,166,842, Cl. 423-387.000.

Sih, John C.: *See*—
Johnson, Roy A.; and Sih, John C., 4,166,903, Cl. 542-426.000.

Singer Company, The: *See*—
Brienza, Michael J.; Garron, Stephen A.; and Sedlatschek, Robert, 4,166,423, Cl. 112-254.000.
Matthies, Alan A., 4,166,996, Cl. 337-386.000.

Sittner, Edward H.: *See*—
Baker, Thomas B.; and Sittner, Edward H., 4,166,520, Cl. 188-33.000.

Skauli, Oyvind; and Isaksen, Jan B., to Norsk Hydro A.S. Method for producing calcium phosphates. 4,166,839, Cl. 423-311.000.

Skiles, Richard D.: *See*—
Pilgram, Kurt H. G.; and Skiles, Richard D., 4,166,735, Cl. 71-118.000.

Skwara, Leo. Oscillating lawn sprinkler. 4,166,578, Cl. 239-242.000.

Slack, Douglas J.: *See*—
Pecker, Guillermo E.; and Slack, Douglas J., 4,166,995, Cl. 337-390.000.

Slater, William L.; and Richter, George N., to Texaco Inc. Gasification of low quality solid fuels. 4,166,802, Cl. 252-373.000.

Smith, David F. Adhesive cements especially adapted to surgical use. 4,166,744, Cl. 106-35.000.

Smith, David R.: *See*—
White, Brian R.; and Smith, David R., 4,166,985, Cl. 331-94.50S.

Smith, Edmund H., Jr., to Du Pont de Nemours, E. I., and Company. Binary patterned web inspection. 4,166,541, Cl. 209-587.000.

Smith, Eugene D. Apparatus for cleaning pipe. 4,166,301, Cl. 15-88.000.

Smith, Forrest D. Bubble forming device. 4,166,336, Cl. 46-6.000.

Smith Kline & French Laboratories Limited: *See*—
Durant, Graham J.; Ganellin, Charon R.; Owen, Geoffrey R.; and Young, Rodney C., 4,166,856, Cl. 424-270.000.
Ganellin, Charon R.; and Young, Rodney C., 4,166,857, Cl. 424-270.000.

SmithKline Corporation: *See*—
Gleason, John G.; Holden, Kenneth G.; and Huffman, William F., 4,166,816, Cl. 260-239.00A.

Smorzaniuk, Adam, to Amerace Corporation. Fluid pressure indicator. 4,166,429, Cl. 116-202.000.

Smyth Manufacturing Compang, The: *See*—
Savich, Peter P., 4,166,300, Cl. 11-1.0AD.

Snodgrass, Michael P. Vehicle braking system. 4,166,654, Cl. 303-14.000.

Sobajima, Shigenobu: *See*—
Chiba, Kiyoshi; Itoh, Kunio; Mitani, Yuji; Yonemura, Utami; and Sobajima, Shigenobu, 4,166,876, Cl. 428-215.000.

Societa Alluminio e Metalli Alumetal S.p.A.: *See*—
Lama, Antonio, 4,166,779, Cl. 204-67.000.

Societa Farmaceutici Italia S.p.A.: *See*—
Bernardi, Luigi; Masi, Paolo; Suarato, Antonino; and Arcamone, Federico, 4,166,848, Cl. 424-180.000.

Societe AATON: *See*—
Beauviala, Jean-Pierre, 4,167,005, Cl. 340-762.000.

Societe Alsacienne de Constructions Mecaniques de Mulhouse: *See*—
Duba, Fernand, 4,166,354, Cl. 57-58.890.

Societe Anonyme Automobiles Citroen: *See*—
de Freminville, Jean-Claude; and Horblin, Michel, 4,166,514, Cl. 180-167.000.

Societe de Vente de l'Aluminium Pechiney: *See*—
Lefebvre, Jacques; and Mazodier, Jean-Louis, 4,166,776, Cl. 204-25.000.

Societe ITI Ltd.: *See*—
Mougin, Georges L., 4,166,363, Cl. 60-641.000.

Societe Suisse pour l'Industrie Horlogere Management Services, S.A.: *See*—
Peyraud, Dominique; and Voumard, Martial, 4,166,563, Cl. 228-47.000.

Soeno, Ko: *See*—
Matsuda, Yasumasa; Yamada, Kazuji; Shimada, Satoshi; Nishihara, Motohisa; Yasuda, Tomio; Tsuchiya, Masatoshi; Soeno, Ko; Ai, Mitsuo; Nagata, Takeo; and Matsuoka, Yoshitaka, 4,166,384, Cl. 73-141.00A.

Solamat Incorporated: *See*—
Loferski, Joseph J.; and Roessler, Barton, 4,166,880, Cl. 428-457.000.

Solartron Electronic Group Limited, The: *See*—
Metcalf, Eric, 4,166,963, Cl. 307-260.000.

Soma, Nobuo; Morimura, Syoji; Yoshioka, Takao; and Kurumada, Tomoyuki, to Sankyo Company Ltd. Polyalkylated 4-aminopiperidine derivatives. 4,166,813, Cl. 260-45.80N.

Sony Corporation: *See*—
Mori, Yoshihisa; Tamura, Shingo; Hoshimi, Susumu; and Yasuda, Shiro, 4,166,624, Cl. 274-9.00C.

Soran, Robert L., to Beatric Foods Co. Nozzle for an apparatus for denaturing food products. 4,166,486, Cl. 141-105.000.

Southwest Research Institute: *See*—
King, James D.; Matzkanin, George A.; and Rollwitz, William L., 4,166,972, Cl. 324-0.5AC.

Spallholz, Julian E. Selenium compounds. 4,166,820, Cl. 260-326.400.

Spanke, Edwin A.; and Carrieri, Louis F., to Gulf & Western Manufacturing Company. Press having overload responsive slide shut height adjusting mechanism. 4,166,415, Cl. 100-53.000.

Spaziante, Placido M.: *See*—
Bianchi, Giuseppe; De Nora, Oronzio; and Spaziante, Placido M., 4,166,780, Cl. 204-99.000.

Spero, Theodore P. Apparatus for equalizing pressure and absorbing shock in a pneumatic braking system. 4,166,655, Cl. 303-87.000.

Spies, Henry J. Dispensing and measuring device. 4,166,487, Cl. 141-358.000.

Spiridonov, Viktor V. Device for securing a pipeline in place. 4,166,710, Cl. 405-172.000.

Stabatrol Corporation: *See*—
Valiga, Richard E., 4,166,709, Cl. 405-128.000.

Stabilus GmbH: *See*—
Freitag, Herbert; and Schnitzius, Klaus, 4,166,612, Cl. 267-65.00R.

Staege, Hermann, to Krupp-Koppers GmbH. Process for the continuous introduction of fine-grained and dust-like solids into a pressurized reaction space. 4,166,731, Cl. 62-46.000.

Stahle, Helmut; Koppe, Herbert; Kummer, Werner; and Hoefke, Wolfgang, to Boehringer Ingelheim GmbH. 2-Bromo-6-fluoro-N-(2-imidazolidinylidene)-benzamine and salts thereof and the use to treat hypertension. 4,166,859, Cl. 424-273.00R.

Stahnecker, Erhard: *See*—
Fried, Michael; Zuern, Ludwig; and Stahnecker, Erhard, 4,166,890, Cl. 521-92.000.

Standard Car Truck Co.: *See*—
Geyer, Robert P.; Veasman, Kenneth F.; and Veeraraghavan, Vilakkudi G., 4,166,756, Cl. 148-35.000.

Standard Oil Company, The: *See*—
Wagner, David R., 4,166,774, Cl. 203-82.000.

Standard Oil Company (Indiana): *See*—
Amick, James W., 4,166,725, Cl. 44-72.000.
Gilliam, Kenneth D.; and Paschke, Edward E., 4,166,873, Cl. 428-35.000.
Steigelmann, Edward F., 4,166,723, Cl. 44-7.00A.

Stankewitz, Hans-Werner: *See*—
Lisfeld, Robert; Wieber, Karl; and Stankewitz, Hans-Werner, 4,166,671, Cl. 350-87.000.

Stansbury, Benny W. Operation and command failure monitor. 4,167,003, Cl. 340-501.000.

Staples, Stanley F. Recovery of silver from hypo. 4,166,781, Cl. 204-109.000.

Stawell, William B.: *See*—
McGeoch, Ian L. M.; and Stawell, William B., 4,167,007, Cl. 343-6.5LC.

Stedman, Robert N., to Caterpillar Tractor Co. Four-track low ground pressure crawler vehicle. 4,166,511, Cl. 180-9.500.

Steele, Donald F., to American District Telegraph Company. Secondary light testing in optical smoke detectors. 4,166,698, Cl. 356-338.000.

Steffen, David E., to Dickey-john Corporation. Seed sensor. 4,166,948, Cl. 250-214.00B.

Stegenga, Philip D.: *See*—
Vandenbrink, Wayne; Stegenga, Philip D.; and Hutchinson, Richard D., Jr., 4,166,651, Cl. 296-84.00B.

Steigelmann, Edward F., to Standard Oil Company (Indiana). Gelled hydrocarbon fuels. 4,166,723, Cl. 44-7.00A.

Stein, Gerald S.: *See*—
Darrah, John L.; and Darrah, John C., 4,166,296, Cl. 4-178.000.

Stein Industrie: *See*—
Duthion, Louis; Sagner, Max; and Portier, Claude, 4,166,477, Cl. 137-604.000.

Steinke, Frederick H.: *See*--
Betz, Norman L.; Lanter, Kent J.; Breuer, Leslie H.; and Steinke, Frederick H., 4,166,867, Cl. 426-73.000.
Stelron Cam Company: *See*—
Beezer, Earl F., 4,166,527, Cl. 198-486.000.
Stendel, Wilhelm: *See*—
Hoffmann, Hellmut; Arlt, Dieter; Hammann, Ingeborg; Homeyer, Bernhard; and Stendel, Wilhelm, 4,166,850, Cl. 424-220.000.
Stepantsov, Georgy K.; Bloschitsyn, Jury N.; Babko, Alexandr A.; Kutlin, Ferdinand K.; and Glazunov, Ivan V. High-speed explosion hammer. 4,166,374, Cl. 72-430.000.
Stepantsov, Georgy K.; Abramov, Valentin S.; Bloschitsyn, Jury N.; Zaripov, Raif R.; Babko, Alexandr A.; Kutlin, Ferdinand K.; Glazunov, Ivan V.; Nilov, Alexei A.; Kuznetsov, Gennady V.; Viter, Petr A.; Pavlov, Alexandr F.; Belonog, Valery M.; Korneev, Vladimir A.; and Zvereva, Emilia I. High-speed explosive hammer. 4,166,375, Cl. 72-430.000.
Stephen, Robert L.: *See*—
Jacobsen, Stephen C.; Stephen, Robert L.; Luntz, Richard D.; Johnson, Richard T.; Knutti, David F.; and Mandleco, Carl F., 4,166,457, Cl. 128-639.000.
Stephens-Adamson, Inc.: *See*—
Renner, Elmer J., 4,166,528, Cl. 198-825.000.
Sterrett, Robert W.; Shu, Larry S.; and Ostertog, Robert J., to W. R. Grace & Co. Low density insulating compositions containing combusted bark particles. 4,166,749, Cl. 106-93.000.
Stewart-Warner Corporation: *See*—
Beise, Theodore W.; and Rice, Robert D., 4,166,579, Cl. 239-526.000.
Stiasny, Carl-Heinz, to Birfield Trasmissioni S.p.A. Jet pipe burner. 4,166,443, Cl. 126-91.00A.
Stiros, Paul, to Procter & Gamble Company. Means for shaping an interleaved stack of sheets to improve the pop-up type dispensing thereof. 4,166,551, Cl. 221-51.000.
Stockman, Richard F., to Air Preheater Company, Inc., The. Static seal. 4,166,496, Cl. 165-9.000.
Stoecker, Hans: *See*—
Schmitz, Rudolf; Pape, Hermann; and Stoecker, Hans, 4,166,308, Cl. 24-84.00R.
Stoepel, Kurt: *See*—
Wehinger, Egbert; Bossert, Friedrich; Meyer, Horst; Heise, Arend; Kazda, Stanislav; Stoepel, Kurt; and Vater, Wulf, 4,166,855, Cl. 424-266.000.
Strelisky, Janos: *See*—
Feuer, Laszlo; Nogradi, Mihaly; Gettsegen, Agnes; Vermes, Borbala; Strelisky, Janos; Wolfner, Andras; Farkas, Lorant; Antus, Sandor; and Toth, Maria K., 4,166,862, Cl. 424-283.000.
Stretch Wrap, Inc.: *See*—
Carlson, Robert F., 4,166,348, Cl. 53-556.000.
Stribling, John B., to Heenan Environmental Systems Ltd. Cyclonic furnace. 4,166,421, Cl. 110-187.000.
Stritzl, Karl: *See*—
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Strom, Gerald A.: *See*—
Bernard, James I.; and Strom, Gerald A., 4,167,000, Cl. 367-84.0LD.
Suarato, Antonino: *See*—
Bernardi, Luigi; Masi, Paolo; Suarato, Antonino; and Arcamone, Federico, 4,166,848, Cl. 424-180.000.
Sugimura, Kazuo: *See*—
Sugimura, Nobuyuki; and Sugimura, Kazuo, 4,166,478, Cl. 138-30.000.
Sugimura, Nobuyuki; and Sugimura, Kazuo. Accumulator having a bladder to be filled with liquid. 4,166,478, Cl. 138-30.000.
Sukornick, Bernard: *See*—
Mastroianni, Martin J.; Orfeo, Sabatino R.; and Sukornick, Bernard, 4,166,798, Cl. 252-63.500.
Sullivan, Paul J.; Behling, Fredric C.; and Ptaszek, George W. Child propelled riding toy. 4,166,630, Cl. 280-87.02R.
Sumitomo Chemical Company, Limited: *See*—
Maeda, Isamu; and Aoshima, Masashi, 4,166,892, Cl. 525-373.000.
Maruyama, Takashi; and Ueno, Katsuji, 4,166,899, Cl. 528-480.000.
Sun, Robert J.; and Maltby, Frederick L., to Drexelbrook Controls, Inc. RF Admittance measuring method and apparatus for determining the level of a conductive liquid. 4,166,388, Cl. 73-304.00R.
Sunahara, Noriyuki: *See*—
Kurooka, Shigeru; and Sunahara, Noriyuki, 4,166,767, Cl. 435-7.000.
Sundqvist, Hans E., to AB Motala Verkstad. Method and an apparatus for preventing deposits in a process water system for a gas generator plant or the like. 4,166,499, Cl. 165-134.00R.
Sunshine Cordage Corporation: *See*—
Carranza, William L., 4,166,357, Cl. 57-310.000.
Suntech, Inc.: *See*—
Recchuite, Alexander D., 4,166,795, Cl. 252-48.600.
Recchuite, Alexander D., 4,166,796, Cl. 252-48.600.
Recchuite, Alexander D., 4,166,797, Cl. 252-48.600.
Surgical Appliance Industries, Inc.: *See*—
Applegate, Leslie T., 4,166,460, Cl. 128-80.00H.
Susi, Anthony R.: *See*—
Phillips, Raymond J.; and Susi, Anthony R., 4,166,921, Cl. 174-70.00S.
Suwa, Hiroyuki: *See*—
Okunishi, Hiromu; Nakaji, Hideki; Suwa, Hiroyuki; and Sato, Hideaki, 4,166,521, Cl. 188-251.00M.
Suzuki, Shigeto, to Chevron Research Company. Process for preparing 1,4-dioxan-2-ones. 4,166,821, Cl. 260-340.200.
Suzuki, Toshio: *See*—
Chiba, Moichi; Ouchi, Hideo; and Suzuki, Toshio, 4,166,662, Cl. 308-235.000.
Suzuki, Yutaka: *See*—
Kobayashi, Kazuo; Yuki, Kiyohiro; and Suzuki, Yutaka, 4,166,923, Cl. 178-67.000.
Svet, Frank A., Jr.: *See*—
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Svoboda, Josef; and Stritzl, Karl, to TMC Corporation. Ski binding part. 4,166,636, Cl. 280-625.000.
Swan, Walter B. Polygonal container. 4,166,568, Cl. 229-23.00R.
Swiss Aluminium Ltd.: *See*—
Dantzig, Jonathan A.; Tyler, Derek E.; and Milici, Richard C., 4,166,604, Cl. 249-122.000.
Fister, Julius C., Jr.; and Breedis, John F., 4,166,755, Cl. 148-2.000.
Switzer, William K. Impulse actuator unit for switches. 4,166,939, Cl. 200-160.000.
Szabo, Imre Z.; Nagy, Kornel; and Finta, Csaba, to Magyar Vagon- es Gepgyar. Apparatus for measuring the damping coefficient of torsional-vibration dampers. 4,166,377, Cl. 73-11.000.
Szasz, Tibor: *See*—
Kirchmeyr, Gustav; Weigl, Erwin; Knotek, Jaroslav; and Szasz, Tibor, 4,166,634, Cl. 280-614.000.
Takada, Shunji: *See*—
Mifune, Hiroyuki; Takada, Shunji; Akimura, Yoshitaka; and Shishido, Tadao, 4,166,742, Cl. 96-107.000.
Takada, Tadamichi: *See*—
Kambe, Masaki; Takada, Tadamichi; Miyazaki, Nobuyuki; Yokokawa, Masanori; and Inoue, Shohei, 4,166,898, Cl. 528-405.000.
Takatsu, Mitsumune: *See*—
Ando, Momofuku; Minami, Junichi; Takatsu, Mitsumune; Ohnishi, Fumio; and Sawada, Makoto, 4,166,868, Cl. 426-441.000.
Takeda, Kunio: *See*—
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Talalaj, Richard. Self-setting weedless lure. 4,166,334, Cl. 43-35.000.
Tamura, Shingo: *See*—
Mori, Yoshihisa; Tamura, Shingo; Hoshimi, Susumu; and Yasuda, Shiro, 4,166,624, Cl. 274-9.00C.
Tanaka, Masaru; and Matsumoto, Yoshimitsu, to Matsushita Electric Industrial Co., Ltd. Apparatus for welding lead wires together. 4,166,943, Cl. 219-159.000.
Tanaka, Yuzo: *See*—
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Taneichi, Sanji. Apparatus for liquefying refrigerant and generating low temperature. 4,166,365, Cl. 62-514.00R.
Tanimura, Koichi: *See*—
Nagasaki, Katsumi; Tanimura, Koichi; Inoue, Yoshihiro; Yamazaki, Hiroyuki; and Momose, Tetsuo, 4,166,609, Cl. 266-86.000.
Tasch, Al F., Jr.; and Frye, Robert C., to Texas Instruments Incorporated. CCD structures with surface potential asymmetry beneath the phase electrodes. 4,167,017, Cl. 357-24.000.
Tatani, Atsushi; Yoneda, Kenichi; Inoue, Yasuyuki; and Atsukawa, Masumi, to Mitsubishi Jukogyo Kabushiki Kaisha. Process for treating exhaust gases. 4,166,838, Cl. 423-242.000.
Tattersall, Edward G., to Hovermarine Transport Limited. Sidewall gas-cushion vehicles. 4,166,515, Cl. 180-119.000.
Taylor, Glenn E. Lift axle wheel assembly. 4,166,639, Cl. 280-704.000.
Teijin Limited: *See*—
Chiba, Kiyoshi; Itoh, Kunio; Mitani, Yuji; Yonemura, Utami; and Sobajima, Shigenobu, 4,166,876, Cl. 428-215.000.
Tenneco Inc.: *See*—
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Terai, Hidekazu: *See*—
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Teraoka, Toru: *See*—
Shigematsu, Taichiro; Kasugai, Hiroshi; Shibahara, Tetsuya; Nakajima, Tetsuo; and Teraoka, Toru, 4,166,846, Cl. 424-81.000.
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Terukina, Jiro: *See*—
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Texaco Inc.: *See*—
Brown, Alfred; Huang, Wann-Sheng; and Shum, Yick-Mow, 4,166,504, Cl. 166-272.000.
Hall, Wilbur L.; Brown, Alfred; and Korstad, Ralph J., 4,166,502, Cl. 166-263.000.
Hall, Wilbur L.; Brown, Alfred; and Korstad, Ralph J., 4,166,503, Cl. 166-263.000.
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Slater, William L.; and Richter, George N., 4,166,802, Cl. 252-373.000.
Texas Instruments Incorporated: *See*—
Pecker, Guillermo E.; and Slack, Douglas J., 4,166,995, Cl. 337-390.000.
Tasch, Al F., Jr.; and Frye, Robert C., 4,167,017, Cl. 357-24.000.

Tezuka, Iwao; and Chagawa, Chikashi, to Kabushiki Kaisha Komatsu Seisakusho. Controlling apparatus for bulldozer blade. 4,166,506, Cl. 172-4.500.

Thoma, Hans-Jurgen: *See—*
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Thomas, Harold W.: *See—*
Depas, Laddie A., Sr., 4,166,656, Cl. 303-115.000.

Thomas J. Lipton, Inc.: *See—*
Sietz, Fritz G., 4,166,823, Cl. 260-403.000.

Thompson, David F.: *See—*
Mouton, William J., Jr.; and Thompson, David F., 4,166,596, Cl. 244-30.000.

Thompson, Joseph K.; Clark, Robert C.; Fielding, George H.; and Bogardus, Harold F., to United States of America, Navy. Collector plates for electrostatic precipitators. 4,166,729, Cl. 55-138.000.

Thompson, LeRoy R.; and Meints, Edward G., to Caterpillar Tractor Co. Gas turbine engine internal insulation comprising metallic mesh—restrained ceramic fiber layer. 4,166,878, Cl. 428-256.000.

Thomson-CSF: *See—*
Fraleux, Jean, 4,166,956, Cl. 250-370.000.

Thornburg, Perry A.: *See—*
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Thorpe, Laurence J.: *See—*
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Three Sisters Ranch Enterprises: *See—*
Faulstich, George W., 4,166,552, Cl. 215-256.000.

Thurmond, Elmer T., Jr., to Equipment Company of America. Adjustable caster. 4,166,516, Cl. 182-15.000.

Tice, Charles, to DeLaval Turbine Inc. Viscosity-compensating flow switch. 4,166,936, Cl. 200-82.00E.

Tick, Paul A.: *See—*
Araujo, Roger J.; and Tick, Paul A., 4,166,745, Cl. 106-47.00Q.

Timm, Edward E.: *See—*
Pate, Kevin T.; and Timm, Edward E., 4,166,385, Cl. 73-190.00R.

TMC Corporation: *See—*
Kirchmeyr, Gustav; Weigl, Erwin; Knotek, Jaroslav; and Szasz, Tibor, 4,166,634, Cl. 280-614.000.
Svoboda, Josef; and Stritzl, Karl, 4,166,636, Cl. 280-625.000.

Tobey, Richard, to Recortec, Inc. Method and an apparatus for time signal encoding/decoding. 4,167,028, Cl. 360-72.200.

Tojyo, Tsutomu, to Olympus Optical Co., Ltd. Objective lens system for microscopes. 4,166,674, Cl. 350-175.0ML.

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Harigane, Kotaro; Kato, Akihiro; and Fujita, Kenji, 4,166,312, Cl. 29-38.00C.

Tokyo Shibaura Electric Co., Ltd.: *See—*
Yamaguchi, Tetsuo, 4,166,360, Cl. 58-39.500.
Yokoyama, Masanori, 4,166,574, Cl. 235-375.000.

Tolbert, William R.; Feder, Joseph; and Kimes, Richard C., to Monsanto Company. Continuous cell culture system. 4,166,768, Cl. 435-286.000.

Tomoyasu, Takatoshi: *See—*
Hayashi, Kuniaki; and Tomoyasu, Takatoshi, 4,166,879, Cl. 428-385.000.

Toray Industries, Inc.: *See—*
Shirasuna, Katuo; Kumo, Ichiro; Kobayashi, Teruo; and Ohno, Shigeo, 4,166,586, Cl. 242-18.0PW.

Torrington Company, The: *See—*
Chiba, Moichi; Ouchi, Hideo; and Suzuki, Toshio, 4,166,662, Cl. 308-235.000.
Murphy, William W., 4,166,660, Cl. 308-202.000.

Toth, Maria K.: *See—*
Feuer, Laszlo; Nogradi, Mihaly; Gettsegen, Agnes; Vermes, Borbala; Strelisky, Janos; Wolfner, Andras; Farkas, Lorant; Antus, Sandor; and Toth, Maria K., 4,166,862, Cl. 424-283.000.

Toyo Boseki Kabushiki Kaisha: *See—*
Umetani, Kohei; Date, Masakazu; and Kawai, Kiyonori, 4,166,897, Cl. 528-398.000.

Toyo Tsushinki Kabushiki Kaisha: *See—*
Funatsu, Chuhei; and Hirata, Toshikiyo, 4,167,006, Cl. 343-6.5LC.

Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
Yamakawa, Yoshio, 4,166,436, Cl. 123-30.00C.

Tremblay, Dennis D.; and Serafini, John, to General Time Corporation. Solid state alarm for clock-radio. 4,166,358, Cl. 58-16.00R.

Tsuchida, Taketoshi; Shinoda, Kenichi; Yamamoto, Kohei; Ikuma, Fumio; and Tanaka, Yuzo, to Fuji Electrochemical Co., Ltd. Package for batteries. 4,166,532, Cl. 206-333.000.

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Tu, Jan-I, to E. R. Squibb & Sons, Inc. Solid phase separation technique for use in radioimmunoassays. 4,166,844, Cl. 424-1.000.

Tuma, Frantisek: *See—*
Chrtek, Milan; Tuma, Frantisek; Gabler, Josef; Kasparek, Karel; and Blasko, Jan, 4,166,356, Cl. 57-302.000.

Tunick, Allen A.; Koff, Fred W.; and Sifniades, Stylianos, to Allied Chemical Corporation. Hydroxylamine purification via liquid/liquid extraction. 4,166,842, Cl. 423-387.000.

Turetsky, Isadore. Filter-purifier cartridge having separable elements. 4,166,793, Cl. 210-315.000.

Turk, Chester F.: *See—*
Krapcho, John; and Turk, Chester F., 4,166,907, Cl. 544-111.000.

Turner, Frederick T., to Varian Associates, Inc. Deposition rate regulation by computer control of sputtering systems. 4,166,783, Cl. 204-192.00R.

Turner Quick-Lift Corporation: *See—*
Van Denberg, Ervin K., 4,166,640, Cl. 280-711.000.

Tyler, Derek E.: *See—*
Dantzig, Jonathan A.; Tyler, Derek E.; and Milici, Richard C., 4,166,604, Cl. 249-122.000.

U and I, Ltd.: *See—*
Kenney, Frank M., 4,167,036, Cl. 363-61.000.

Ueno, Katsuji: *See—*
Maruyama, Takashi; and Ueno, Katsuji, 4,166,899, Cl. 528-480.000.

Ueno, Toshiyuki; Itoh, Isamu; and Morita, Yasuyuki, to Japanese National Railways. Process for excavating and constructing tunnel and excavating device. 4,166,509, Cl. 175-94.000.

Umetani, Kohei; Date, Masakazu; and Kawai, Kiyonori, to Toyo Boseki Kabushiki Kaisha. Phosphorus-containing condensation products, their production and their use as flame retardants. 4,166,897, Cl. 528-398.000.

Unigate Limited: *See—*
Henson, Kenneth, 4,166,870, Cl. 427-122.000.

Union Camp Corporation: *See—*
Nightingale, Frank J., 4,166,459, Cl. 128-75.000.
Sanders, James R., 4,166,482, Cl. 141-1.000.

Union Carbide Corporation: *See—*
D'Silva, Themistocles D. J., 4,166,864, Cl. 424-285.000.
Higley, David P.; Culp, Gary L.; Crandall, John W.; and Farquhar, Scott M., 4,166,773, Cl. 203-72.000.

Uniroyal GmbH: *See—*
Poque, Dionysius J., 4,166,490, Cl. 152-209.00R.

U.S. Baird Corporation, The: *See—*
Knight, David W., 4,166,372, Cl. 72-348.000.

United States of America
Air Force: *See—*
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Seifert, Clair F.; Seapy, Harvey S.; and Petersen, Thorvald K., 4,166,597, Cl. 244-160.000.
Seifert, Clair F.; Seapy, Harvey S.; and Dunlap, David E., 4,166,598, Cl. 244-160.000.
Army: *See—*
Kerr, John L., 4,167,010, Cl. 343-700.0MS.
McCready, John E., 4,166,874, Cl. 428-35.000.
Energy: *See—*
Fowler, T. Kenneth; and Condit, William C., 4,166,760, Cl. 176-3.000.
Kassner, David A., 4,166,990, Cl. 335-216.000.
Interior: *See—*
Bruckenstein, Stanley; and Sherwood, William G., 4,166,775, Cl. 204-1.00T.
National Aeronautics & Space Administration: *See—*
Ivie, Charles V., 4,166,959, Cl. 250-551.000.
Navy: *See—*
Brady, Jesse J., III, 4,166,999, Cl. 367-105.000.
Collins, David A.; and Lile, Derek L., 4,166,782, Cl. 204-129.300.
Horning, John E.; Radzai, Roy R.; and Hagstrom, John R., 4,166,694, Cl. 355-77.000.
McCartney, Joseph F.; and Shipman, William H., 4,166,884, Cl. 429-10.000.
Phillips, Raymond J.; and Susi, Anthony R., 4,166,921, Cl. 174-70.00S.
Shaffer, Joseph J.; and Butler, John D., 4,166,342, Cl. 51-58.000.
Thompson, Joseph K.; Clark, Robert C.; Fielding, George H.; and Bogardus, Harold F., 4,166,729, Cl. 55-138.000.
Vermeers, Stanley L., 4,166,974, Cl. 324-60.0CD.

U.S. Philips Corporation: *See—*
Hoeberechts, Arthur M. E., 4,166,969, Cl. 313-371.000.
Kowalsi, Gunter, 4,167,039, Cl. 364-515.000.
Milants, Lodewijk L., 4,166,593, Cl. 242-199.000.
Willard, Gerald A., 4,167,035, Cl. 363-60.000.

University of Utah Research Institute: *See—*
Jacobsen, Stephen C.; Stephen, Robert L.; Luntz, Richard D.; Johnson, Richard T.; Knutti, David F.; and Mandleco, Carl F., 4,166,457, Cl. 128-639.000.

UOP Inc.: *See—*
Jensen, Robert H.; and Morris, J. Wayne, 4,166,434, Cl. 122-356.000.

Upjohn Company, The: *See—*
Bundy, Gordon L., 4,166,912, Cl. 560-61.000.
Johnson, Roy A.; and Sih, John C., 4,166,903, Cl. 542-426.000.
McCall, John M., 4,166,853, Cl. 424-258.000.

Utting, Peter R. Movable curtain partition. 4,166,494, Cl. 160-330.000.

Valiga, Richard E., to Stabatrol Corporation. Method for vaulting hazardous chemical waste materials. 4,166,709, Cl. 405-128.000.

Valmet Oy: *See—*
Kirjavainen, Alvi, 4,166,759, Cl. 162-337.000.

Vanaver, Eugene L.: *See—*
Casson, Edward A., Jr.; Gaul, Albro T.; Langlais, Eugene L.; Shadlen, Gerald; and Vanaver, Eugene L., 4,166,777, Cl. 204-28.000.

van den Berg, Arie P., to Ingenieursbureau A.P. van den Berg B.V. Method and a device for introducing a tubular assembly into the soil. 4,166,508, Cl. 175-20.000.

Van Denberg, Ervin K., to Turner Quick-Lift Corporation. Axle suspension for wheeled vehicles. 4,166,640, Cl. 280-711.000.

Vandenbrink, Wayne; Stegenga, Philip D.; and Hutchinson, Richard D., Jr., to Donnelly Mirrors, Inc. Vehicular mirror assembly and pivot support assembly therefor. 4,166,651, Cl. 296-84.00B.

Van den Bussche, Francis: *See—*
Daumas, Jean-Claude; Derrien, Jean-Yves; and Van den Bussche, Francis, 4,166,808, Cl. 252-455.00R.

Van Winckel, Carl E.; Dolphin, David H.; Dumitrescu, Elena; and Van Winckel, Kent F., to Van Winckel, Carl E. Production of o-alkoxyphenols. 4,166,914, Cl. 568-652.000.

Van Winckel, Kent F.: *See—*
Van Winckel, Carl E.; Dolphin, David H.; Dumitrescu, Elena; and Van Winckel, Kent F., 4,166,914, Cl. 568-652.000.

Varian Associates, Inc.: *See—*
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Vater, Wulf: *See—*
Wehinger, Egbert; Bossert, Friedrich; Meyer, Horst; Heise, Arend; Kazda, Stanislav; Stoepel, Kurt; and Vater, Wulf, 4,166,855, Cl. 424-266.000.

Vaughn Corporation: *See—*
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Veasman, Kenneth F.: *See—*
Geyer, Robert P.; Veasman, Kenneth F.; and Veeraraghavan, Vilakkudi G., 4,166,756, Cl. 148-35.000.

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Geyer, Robert P.; Veasman, Kenneth F.; and Veeraraghavan, Vilakkudi G., 4,166,756, Cl. 148-35.000.

Verein zur Forderung der Giesserei-Industrie: *See—*
Berger, Peter; Lampic, Milan; Muller, Jorg; and Orths, Kurt, 4,166,378, Cl. 73-15.00B.

Verge, John P.: *See—*
Ross, William J.; Verge, John P.; and Williamson, William R. N., 4,166,818, Cl. 348-128.000.

Vermeers, Stanley L., to United States of America, Navy. Apparatus and method for measuring capacitive energy. 4,166,974, Cl. 324-60.0CD.

Vermes, Borbala: *See—*
Feuer, Laszlo; Nogradi, Mihaly; Gettsegen, Agnes; Vermes, Borbala; Strelisky, Janos; Wolfner, Andras; Farkas, Lorant; Antus, Sandor; and Toth, Maria K., 4,166,862, Cl. 424-283.000.

Versteege, Arnoldus J. Apparatus for manufacturing plastic bags with connection nipples. 4,166,412, Cl. 93-8.0VB.

Vesperman, William C.: *See—*
Congdon, Wayne I.; Mottine, John J.; and Vesperman, William C., 4,166,881, Cl. 428-463.000.

Vestergaard, Bent. Method and apparatus for cultivation of plants grown singly in separate beds. 4,166,341, Cl. 47-59.000.

Viering, Rudolf, to Pixyfoto GmbH. Stand for a studio camera and a photographic studio equipped therewith. 4,166,687, Cl. 354-290.000.

Vihl, Bernhard. Reinforcing welds for fluid conduit wrapping for vessels. 4,166,942, Cl. 219-137.00R.

Vinals, Joaquin F.: *See—*
Sanders, James M.; Vinals, Joaquin F.; and Schmitt, Frederick L., 4,166,916, Cl. 568-820.000.

Viter, Petr A.: *See—*
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Vogel, Gerhard: *See—*
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Vogt, B. Richard: *See—*
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Voss, Houston F.: *See—*
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Votavova, Eva: *See—*
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Voumard, Martial: *See—*
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Vyskumny ustav mechanizacie a automatizacie: *See—*
Figura, Zdenko, 4,166,394, Cl. 73-597.000.

Vyzkumny ustav bavlnarsky: *See—*
Chrtek, Milan; Tuma, Frantisek; Gabler, Josef; Kasparek, Karel; and Blasko, Jan, 4,166,356, Cl. 57-302.000.

W. M. Cissell Manufacturing Company: *See—*
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W. R. Grace & Co.: *See—*
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Sterrett, Robert W.; Shu, Larry S.; and Ostertog, Robert J., 4,166,749, Cl. 106-93.0o0.

WABCO Westinghouse GmbH: *See—*
Ruhnau, Gerhard; and Gudat, Wolfgang, 4,166,976, Cl. 324-166.000.

Wade, Peter C.; Vogt, B. Richard; and Kissick, Thomas P., to E. R. Squibb & Sons, Inc. 3-(Nitrogen containing heterocyclic)amino) benzisothiazole-1,1-dioxide. 4,166,910, Cl. 544-212.000.

Waggener, William N., to Schlumberger Technology Corporation. System and method for extracting timing information from a modulated carrier. 4,166,979, Cl. 325-321.000.

Waggon Union GmbH: *See—*
Pieger, Johannes; and Preuss, Manfred, 4,166,420, Cl. 105-224.00R.

Waggonfabrik Uerdingen A.G. Werk Dusseldorf: *See—*
Geers, Leo; Muskens, Peter; and Schillings, Dieter, 4,166,611, Cl. 267-3.000.

Wagner, David R., to Standard Oil Company, The. Acrylic acid recovery and purification. 4,166,774, Cl. 203-82.000.

Waldorf, Lindsey E.: *See—*
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Walker, Garland H.; and Hall, Ernest M., Jr., to Western Geophysical Co. of America. Multi-contact connectors with individual resilient contact inserts. 4,166,663, Cl. 339-49.00B.

Wallace, Marshall E., to W. M. Cissell Manufacturing Company. Steam finishing platen. 4,166,331, Cl. 38-15.000.

Walton, Lewis A., to Babcock & Wilcox Company, The. Nuclear fuel element nut retainer cup tool. 4,166,313, Cl. 29-243.500.

Wang, Richard H. S.: *See—*
Irick, Gether, Jr.; Ownby, James C.; and Wang, Richard H. S., 4,166,803, Cl. 252-402.000.

Ward, Edward B. Scaffold for poured concrete walls and forms. 4,166,603, Cl. 249-20.000.

Warhol, John G. Scrubber. 4,166,730, Cl. 55-223.000.

Warner, Kenneth N., Jr., to Owens-Corning Fiberglas Corporation. Polyester production. 4,166,896, Cl. 528-301.000.

Warrick, Edward C.; and Davis, Michael, to Rockwell International Corporation. Wheel and disc continuous integrator. 4,166,386, Cl. 73-194.00R.

Watanabe, Noritoshi; Nakamura, Masato; and Fujita, Seigoro, to Kanzaki Paper Manufacturing Co., Ltd. Method for the production of a matted transparent paper and the product thereof. 4,166,758, Cl. 162-117.000.

Watson, Francis M., III: *See—*
Lilly, A. Clifton, Jr.; Watson, Francis M., III; Martin, Peter; and Price, John S., 4,166,973, Cl. 324-58.50B.

Weakley, Burton: *See—*
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Webb, Maurice J., to Hoke, Inc. Bellows seal valve. 4,166,607, Cl. 251-335.00B.

Weber, Harold J. Didactic apparatus including handheld responsor means. 4,166,325, Cl. 35-9.00C.

Weber, Jerome B. Leaching column and method of use. 4,166,720, Cl. 23-230.00R.

Webinger, George P., to Champion International Corporation. Air freshener carton. 4,166,565, Cl. 229-8.000.

Webster, Donald A., to Du Pont de Nemours, E. I., and Company. Centrifuge tube enclosure. 4,166,573, Cl. 233-26.000.

Webster, Frank G.; and Regan, Michael T., to Eastman Kodak Company. Electrophotosensitive materials for migration imaging processes. 4,166,740, Cl. 96-1.0PE.

Weetall, Howard H., to Corning Glass Works. Detecting Neisseria bacteria. 4,166,765, Cl. 435-26.000.

Wehinger, Egbert; Bossert, Friedrich; Meyer, Horst; Heise, Arend; Kazda, Stanislav; Stoepel, Kurt; and Vater, Wulf, to Bayer Aktiengesellschaft. 1,4-Dihydro-2,6-dimethyl-4-(3-nitrophenyl)-3,5-pyridinedicarboxylic acid ester, and its use as a peripheral vasodilator. 4,166,855, Cl. 424-266.000.

Weigl, Erwin: *See—*
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Werner, Anton, to Kuhn, S.A. Front deflector for a mower having cutter-carrying discs driven from beneath. 4,166,350, Cl. 56-320.100.

Werner, Lothar; and Milke, Siegfried. Cargo carrier for motor vehicles. 4,166,560, Cl. 224-42.10F.

West, Frederick P. Method and apparatus for harvesting green peanuts. 4,166,505, Cl. 171-1.000.

Western Electric Company: *See—*
Congdon, Wayne I.; Mottine, John J.; and Vesperman, William C., 4,166,881, Cl. 428-463.000.

Western Geophysical Co. of America: *See—*
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Westinghouse Electric Corp.: *See—*
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Garbuny, Max, 4,166,951, Cl. 250-284.000.
Hundstad, Richard L.; and Wutzke, Steve A., 4,166,986, Cl. 331-94.5PE.

Wettersten, Karl-Bertil W.: *See—*
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Wetzel, Lewis K.; and Proulx, Edward A., to General Electric Company. Ammunition handling system. 4,166,408, Cl. 89-33.00D.

White, Brian R.; and Smith, David R., to Post Office, The. Injection laser stabilization. 4,166,985, Cl. 331-94.50S.

White, Maynard E.; Monroe, Kenneth E.; and Waldorf, Lindsey E., to White, Maynard E. Two-way voice controlled communication system. 4,166,978, Cl. 325-22.000.

Wieber, Karl: *See—*
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Wight, Hewitt G.; Call, Tracey G.; and Mortensen, Martin L., to California Polytechnic State University Foundation, The. Immuno-

suppressive method with dithiocarbamates. 4,166,866, Cl. 424-300.000.
Wilhelm Stoll Maschinenfabrik GmbH: *See—*
Knusting, Gregor, 4,166,352, Cl. 56-366.000.
Willard, Gerald A., to U.S. Philips Corporation. Voltage multipliers. 4,167,035, Cl. 363-60.000.
William H. Rorer, Inc.: *See—*
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Williams, Ralph P., to Phillips Petroleum Company. Dialkyltin bis(3-sulfolanylmercaptides) as thermal stabilizers for polyvinyl chloride. 4,166,815, Cl. 260-45.75S.
Williamson, William R. N.: *See—*
Ross, William J.; Verge, John P.; and Williamson, William R. N., 4,166,818, Cl. 548-128.000.
Willis, Donald H., to RCA Corporation. Automatic peak beam current limiter. 4,167,025, Cl. 358-243.000.
Wilson Greatbatch Ltd.: *See—*
Mueller, Max A.; McLean, Robert L.; Holmes, Curtis F.; and Greatbatch, Wilson, 4,166,887, Cl. 429-191.000.
Wilson, Ronald, to Vaughn Corporation. Carrier release sheet. 4,166,456, Cl. 128-640.000.
Winter, Bruce L.: *See—*
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Wisconsin Alumni Research Foundation: *See—*
Metzenberg, Robert L.; Larson, Frank C.; and Kahan, Lawrence, 4,166,766, Cl. 435-21.000.
Wittlinger, Karl F.; and Issler, Jorg, to Robert Bosch GmbH. Rotary pulse generator for automatic engine ignition advance and retard. 4,166,966, Cl. 310-111.000.
Wokas, Albert L. Gasoline vapor emission control. 4,166,485, Cl. 141-52.000.
Wolber, William G., to Bendix Corporation, The. Method of making a multiorifice structure. 4,166,564, Cl. 228-156.000.
Wolfner, Andras: *See—*
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Woo, Lecon, to Du Pont de Nemours, E. I., and Company. Apparatus for determining the viscosity of fluids. 4,166,381, Cl. 73-54.000.
Woodard, Kenneth E., Jr.: *See—*
Kadija, Igor V.; and Woodard, Kenneth E., Jr., 4,166,785, Cl. 204-296.000.
Woodcock, Sidney H.; and Maes, Michel E. Explosive boosting device for low-sensitivity blasting agents. 4,166,417, Cl. 102-23.000.
Wooden, William G.: *See—*
Miller, Gerald K.; and Wooden, William G., 4,166,448, Cl. 126-299.00D.
Woodward, James G., to Data General Corporation. Current mode D/A converter. 4,166,962, Cl. 307-237.000.
Wooten, Willis C., Jr.: *See—*
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Wortmann, Joachim; Dany, Franz-Josef; and Kandler, Joachim, to Hoechst Aktiengesellschaft. Intumescent flame-retardant coating compositions. 4,166,743, Cl. 252-8.100.
Wressell, Charles. Coordination practice device. 4,166,327, Cl. 35-11.00R.
Wu, Ching H.: *See—*
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Wutzke, Steve A.: *See—*
Hundstad, Richard L.; and Wutzke, Steve A., 4,166,986, Cl. 331-94.5PE.
Wykes, Robert D.; and Roy, Colin, to Morgan Construction Company. Apparatus for laterally arranging bars. 4,166,526, Cl. 198-458.000.
Xerox Corporation: *See—*
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Yaguchi, Masachika: *See—*
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Yamada, Kazuji: *See—*
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Yamada, Shigeru: *See—*
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Yamaguchi, Tetsuo, to Tokyo Shibaura Electric Co., Ltd. Chronograph. 4,166,360, Cl. 58-39.500.
Yamakawa, Yoshio, to Toyota Jidosha Kogyo Kabushiki Kaisha. Combustion chamber of an internal combustion engine. 4,166,436, Cl. 123-30.00C.
Yamamoto, Kohei: *See—*
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Yamamoto, Manabu: *See—*
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Yamamoto, Shunji: *See—*
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Yu, Ho, to Aluminum Company of America. Ingot casting method. 4,166,495, Cl. 164-89.000.
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# LIST OF DEFENSIVE PUBLICATIONS

## APPLICANTS TO WHOM

## DEFENSIVE PUBLICATIONS WERE ISSUED ON THE 4TH DAY OF SEPTEMBER, 1979

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O. G. 687.

Affolter, Peter; and Matharani, Michael A. Battery package and assembly. T986,011, 9-4-79, Cl. 429-157.000.

Barrier, George E. Method for controlling herbaceous weeds. T986,003, 9-4-79, Cl. 71-86.000.

Bexford Limited: *See*—
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Gordon, Samuel; and Bullock, Milon W. Apparatus for holding plates being subjected to multiple development under controlled time. T986,008, 9-4-79, Cl. 210-198.00C.

Harrison, Cecil P., to Tennessee Valley Authority. Granulation of fertilizer borate. T986,002, 9-4-79, Cl. 71-64.00D.

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Jones, Thomas M.; and Stinson, John M., to Tennessee Valley Authority. Production of suspension fertilizers from orthophosphoric acid. T986,001, 9-4-79, Cl. 71-37.000.

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Muller, Patrick J., to Shell Oil Company. Fuel flow regulator for carburetors. T986,009, 9-4-79, Cl. 261-69.00R.

Papia, Joseph D., to Mobil Oil Corporation. Stress diffuser. T986,007, 9-4-79, Cl. 122-360.000.

Shell Oil Company: *See*—
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# LIST OF REISSUE PATENTEES

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## PATENTS WERE ISSUED ON THE 4TH DAY OF SEPTEMBER, 1979

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

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Richmond, Richard M., to Shoe & Allied Research Assoc., The. Automatically guiding workpieces through a machine. Re. 30,091, Cl. 318-575.000.

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Goldfarb, Adolph E.; Benkoe, Erwin, deceased; and by Benkoe, Elisabeth, executrix. Propeller driven toy vehicle. 252,817, 9-4-79, Cl. D21-76.000.
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Bocko, John J., 252,810, Cl. D14-96.000.
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Taylor, Tad. Storage cabinet or similar article. 252,777, 9-4-79, Cl. D6-5.000.

Taylor, Tad. Storage cabinet or similar article. 252,778, 9-4-79, Cl. D6-5.000.

Toder, Ellis I. Drapery track. 252,793, 9-4-79, Cl. D8-377.000.

Usuda, Genji, to Citizen Watch Co., Ltd. Clock. 252,801, 9-4-79, Cl. D10-15.000.

Vaughan Furniture Company, Inc.: *See*—
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Vercon, Inc.: *See*—
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Vosti, Donald C.; and Silverman, Alan, to American Can Company. Packaging container for food or the like. 252,798, 9-4-79, Cl. D9-216.000.

Watson, John D. High-pressure rotary nozzle. 252,819, 9-4-79, Cl. D23-34.000.

Wills, Roy K., Jr., to International Leisure Activities, Inc. Candy. 252,776, 9-4-79, Cl. D1-15.000.

Withers, Stanley J.; and Sturm, Ronald L., to Oxford Laboratories, Inc. Pipette. 252,823, 9-4-79, Cl. D24-55.000.

Withers, Stanley J.: *See*—
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WWG Industries, Inc.: *See*—
Green, Edward N., 252,780, Cl. D6-29.000.

Yamaguchi, Kinichiro, to Kabushiki Kaisha Ekijibishon. Packaging container. 252,799, 9-4-79, Cl. D9-216.000.

Yip, Wan K., to Chung Ah Manufacturing Company, Limited. Lantern. 252,834, 9-4-79, Cl. D48-24.00R.

# CLASSIFICATION OF PATENTS

## ISSUED SEPTEMBER 4, 1979

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|---|---|
| 84 R | 4,166,308 |
| 221 R | 4,166,309 |

**CLASS 29**

| | |
|---|---|
| 23.5 | 4,166,310 |
| 33 A | 4,166,311 |
| 38 C | 4,166,312 |
| 243.5 | 4,166,313 |
| 517 | 4,166,314 |
| 564.4 | 4,166,315 |
| 626 | 4,166,316 |

**CLASS 30**

| | |
|---|---|
| 276 | 4,166,317 |

**CLASS 33**

| | |
|---|---|
| 1 G | 4,166,318 |
| 24 B | 4,166,319 |
| 31 | 4,166,320 |
| 179.5 R | 4,166,323 |
| 241 | 4,166,324 |
| 432 | 4,166,321 |
| | 4,166,322 |

**CLASS 35**

| | |
|---|---|
| 9 A | 4,166,326 |
| 9 C | 4,166,325 |
| 11 R | 4,166,327 |

**CLASS 36**

| | |
|---|---|
| 72 R | 4,166,328 |
| 97 | 4,166,329 |

**CLASS 37**

| | |
|---|---|
| 53 | 4,166,330 |

**CLASS 38**

| | |
|---|---|
| 15 | 4,166,331 |

**CLASS 40**

| | |
|---|---|
| 605 | 4,166,332 |

**CLASS 42**

| | |
|---|---|
| 1 T | 4,166,333 |

**CLASS 43**

| | |
|---|---|
| 35 | 4,166,334 |

**CLASS 44**

| | |
|---|---|
| 7 A | 4,166,723 |
| 56 | 4,166,724 |
| 72 | 4,166,725 |
| 73 | 4,166,726 |

**CLASS 46**

| | |
|---|---|
| 1 R | 4,166,335 |
| 6 | 4,166,336 |
| 232 | 4,166,337 |
| 253 | 4,166,338 |

**CLASS 47**

| | |
|---|---|
| 17 | 4,166,339 |
| 58 | 4,166,340 |
| 59 | 4,166,341 |

**CLASS 51**

| | |
|---|---|
| 58 | 4,166,342 |

**CLASS 52**

| | |
|---|---|
| 66 | 4,166,343 |
| 167 | 4,166,344 |
| 172 | 4,166,345 |
| 211 | 4,166,346 |
| 223 R | 4,166,347 |

**CLASS 53**

| | |
|---|---|
| 556 | 4,166,348 |

**CLASS 55**

| | |
|---|---|
| 17 | 4,166,727 |
| 51 | 4,166,728 |
| 138 | 4,166,729 |
| 223 | 4,166,730 |

**CLASS 56**

| | |
|---|---|
| 10.2 | 4,166,349 |
| 192 | 4,166,351 |
| 320.1 | 4,166,350 |
| 366 | 4,166,352 |
| 377 | 4,166,353 |

**CLASS 57**

| | |
|---|---|
| 58.89 | 4,166,354 |
| 212 | 4,166,355 |
| 302 | 4,166,356 |
| 310 | 4,166,357 |

**CLASS 58**

| | |
|---|---|
| 16 R | 4,166,358 |
| 23 BA | 4,166,359 |
| 39.5 | 4,166,360 |

**CLASS 60**

| | |
|---|---|
| 39.18 R | 4,166,361 |
| | 4,166,362 |
| 641 | 4,166,363 |

**CLASS 62**

| | |
|---|---|
| 46 | 4,166,731 |
| 384 | 4,166,364 |
| 514 R | 4,166,365 |

**CLASS 64**

| | |
|---|---|
| 17 SP | 4,166,366 |

**CLASS 68**

| | |
|---|---|
| 9 | 4,166,367 |
| 20 | 4,166,368 |

**CLASS 71**

| | |
|---|---|
| 92 | 4,166,732 |
| 97 | 4,166,733 |
| 111 | 4,166,734 |
| 118 | 4,166,735 |

**CLASS 72**

| | |
|---|---|
| 26 | 4,166,369 |
| 105 | 4,166,370 |
| 122 | 4,166,371 |
| 348 | 4,166,372 |
| 356 | 4,166,373 |
| 430 | 4,166,374 |
| | 4,166,375 |

**CLASS 73**

| | |
|---|---|
| 1 F | 4,166,376 |
| 11 | 4,166,377 |
| 15 B | 4,166,378 |
| 23 | 4,166,379 |
| | 4,166,380 |
| 54 | 4,166,381 |
| 115 | 4,166,382 |
| 136 A | 4,166,383 |
| 141 A | 4,166,384 |
| 190 R | 4,166,385 |
| 194 F | 4,166,387 |
| 194 R | 4,166,386 |
| 304 R | 4,166,388 |
| 343 R | 4,166,389 |
| 355 R | 4,166,390 |
| 425.4 R | 4,166,391 |
| | 4,166,392 |
| 579 | 4,166,393 |
| 597 | 4,166,394 |
| 622 | Re.30,088 |
| 634 | 4,166,395 |
| 706 | 4,166,396 |
| 744 | 4,166,397 |

**CLASS 74**

| | |
|---|---|
| 60 | 4,166,398 |
| 320 | 4,166,399 |
| 552 | 4,166,400 |
| 802 | 4,166,401 |
| 822 | 4,166,402 |

**CLASS 75**

| | |
|---|---|
| 0.5 BA | 4,166,736 |
| 104 | 4,166,737 |
| 130 R | 4,166,738 |
| 157.5 | 4,166,739 |

**CLASS 83**

| | |
|---|---|
| 13 | 4,166,403 |
| 167 | 4,166,404 |

**CLASS 84**

| | |
|---|---|
| 1.24 | 4,166,405 |

**CLASS 89**

| | |
|---|---|
| 1.815 | 4,166,406 |
| 12 | 4,166,407 |
| 33 D | 4,166,408 |
| 128 | 4,166,409 |

**CLASS 91**

| | |
|---|---|
| 50 | 4,166,410 |
| 337 | 4,166,411 |

**CLASS 93**

| | |
|---|---|
| 8 VB | 4,166,412 |

**CLASS 96**

| | |
|---|---|
| 1 PE | 4,166,740 |
| 77 | 4,166,741 |
| 107 | 4,166,742 |

**CLASS 99**

| | |
|---|---|
| 393 | 4,166,413 |

**CLASS 100**

| | |
|---|---|
| 43 | 4,166,414 |
| 53 | 4,166,415 |

**CLASS 102**

| | |
|---|---|
| 2 | 4,166,416 |
| 23 | 4,166,417 |
| 24 R | 4,166,418 |

**CLASS 104**

| | |
|---|---|
| 138 R | 4,166,419 |

**CLASS 105**

| | |
|---|---|
| 224 R | 4,166,420 |

**CLASS 106**

| | |
|---|---|
| 35 | 4,166,744 |
| 47 Q | 4,166,745 |
| | 4,166,746 |
| 50 | 4,166,747 |
| 66 | 4,166,748 |
| 93 | 4,166,749 |
| 109 | 4,166,750 |
| 112 | 4,166,751 |
| 273 N | 4,166,752 |
| 308 Q | 4,166,753 |

**CLASS 110**

| | |
|---|---|
| 187 | 4,166,421 |

**CLASS 112**

| | |
|---|---|
| 254 | 4,166,423 |
| 311 | 4,166,422 |

**CLASS 113**

| | |
|---|---|
| 114 BE | 4,166,424 |

**CLASS 114**

| | |
|---|---|
| 39 | 4,166,425 |
| 65 R | 4,166,426 |
| 251 | 4,166,427 |

**CLASS 116**

| | |
|---|---|
| 86 | 4,166,428 |
| 202 | 4,166,429 |
| | 4,166,430 |
| 227 | 4,166,431 |

**CLASS 119**

| | |
|---|---|
| 23 | 4,166,432 |

**CLASS 122**

| | |
|---|---|
| 6.6 | 4,166,433 |
| 356 | 4,166,434 |

**CLASS 123**

| | |
|---|---|
| 25 B | 4,166,435 |
| 30 C | 4,166,436 |
| 32 EC | 4,166,437 |
| 43 R | 4,166,438 |
| 117 R | 4,166,439 |
| | 4,166,440 |
| 180 R | 4,166,441 |
| 198 D | 4,166,442 |

**CLASS 126**

| | |
|---|---|
| 91 A | 4,166,443 |
| 121 | 4,166,444 |
| 298 | 4,166,447 |
| 299 D | 4,166,448 |
| 400 | 4,166,449 |
| 432 | 4,166,445 |
| 438 | 4,166,446 |

**CLASS 128**

| | |
|---|---|
| 24 R | 4,166,458 |
| 75 | 4,166,459 |
| 80 H | 4,166,460 |
| 132 D | 4,166,461 |
| 145 R | 4,166,462 |
| 165 | 4,166,463 |
| 287 | 4,166,464 |
| 303.13 | 4,166,465 |
| 325 | 4,166,466 |
| 351 | 4,166,467 |
| | 4,166,468 |
| 419 PG | 4,166,470 |
| 478 | 4,166,471 |
| 639 | 4,166,453 |
| | 4,166,457 |
| 640 | 4,166,456 |
| 666 | 4,166,454 |
| 691 | 4,166,455 |
| 736 | 4,166,451 |
| 741 | 4,166,452 |
| 764 | 4,166,450 |
| 784 | 4,166,469 |

**CLASS 132**

| | |
|---|---|
| 9 | 4,166,472 |
| | 4,166,473 |
| 88.7 | 4,166,474 |

**CLASS 134**

| | |
|---|---|
| 24 | 4,166,754 |

**CLASS 136**

| | |
|---|---|
| 89 CA | 4,166,917 |
| 89 CL | 4,166,919 |
| 89 R | 4,166,918 |

**CLASS 137**

| | |
|---|---|
| 68 R | 4,166,475 |
| 103 | 4,166,476 |
| 604 | 4,166,477 |

**CLASS 138**

| | |
|---|---|
| 30 | 4,166,478 |
| 97 | 4,166,479 |

**CLASS 139**

| | |
|---|---|
| 54 | 4,166,480 |

**CLASS 141**

| | |
|---|---|
| 1 | 4,166,481 |
| | 4,166,482 |
| | 4,166,483 |
| 4 | 4,166,484 |
| 52 | 4,166,485 |
| 105 | 4,166,486 |
| 358 | 4,166,487 |

**CLASS 145**

| | |
|---|---|
| 61 G | 4,166,488 |

**CLASS 148**

| | |
|---|---|
| 2 | 4,166,755 |
| 35 | 4,166,756 |

**CLASS 150**

| | |
|---|---|
| | 4,166,489 |

**CLASS 152**

| | |
|---|---|
| 209 R | 4,166,490 |
| 354 R | 4,166,491 |
| 362 R | 4,166,492 |

**CLASS 156**

| | |
|---|---|
| 384 | 4,166,757 |

**CLASS 157**

| | |
|---|---|
| 1.21 | 4,166,493 |

**CLASS 160**

| | |
|---|---|
| 330 | 4,166,494 |

**CLASS 162**

| | |
|---|---|
| 117 | 4,166,758 |
| 337 | 4,166,759 |

**CLASS 164**

| | |
|---|---|
| 89 | 4,166,495 |

**CLASS 165**

| | |
|---|---|
| 9 | 4,166,496 |
| 111 | 4,166,497 |
| 133 | 4,166,498 |
| 134 R | 4,166,499 |

**CLASS 166**

| | |
|---|---|
| 250 | 4,166,500 |
| 263 | 4,166,501 |
| | 4,166,502 |
| | 4,166,503 |
| 272 | 4,166,504 |

**CLASS 171**

| | |
|---|---|
| 1 | 4,166,505 |

**CLASS 172**

| | |
|---|---|
| 4.5 | 4,166,506 |

**CLASS 173**

| | |
|---|---|
| 105 | 4,166,507 |

**CLASS 174**

| | |
|---|---|
| 15 C | 4,166,920 |
| 70 S | 4,166,921 |

**CLASS 175**

| | |
|---|---|
| 20 | 4,166,508 |
| 94 | 4,166,509 |

**CLASS 176**

| | |
|---|---|
| 3 | 4,166,760 |
| 7 | 4,166,761 |
| 20 R | 4,166,762 |

**CLASS 177**

| | |
|---|---|
| 16 | 4,166,510 |

**CLASS 178**

| | |
|---|---|
| 22 | 4,166,922 |
| 67 | 4,166,923 |

**CLASS 179**

| | |
|---|---|
| 1 AT | 4,166,926 |
| 1 GM | 4,166,925 |
| 1 P | 4,166,924 |
| 2 EB | 4,166,927 |
| 18 BG | 4,166,929 |
| 18 FA | 4,166,928 |
| 18 HB | 4,166,930 |
| 35 | 4,166,931 |
| 121 R | 4,166,932 |
| 146 E | 4,166,933 |

**CLASS 180**

| | |
|---|---|
| 9.5 | 4,166,511 |
| 9.64 | 4,166,512 |
| 119 | 4,166,515 |
| 167 | 4,166,514 |
| 271 | 4,166,513 |

**CLASS 182**

| | |
|---|---|
| 15 | 4,166,516 |

**CLASS 187**

| | |
|---|---|
| 6 | 4,166,517 |
| 29 R | 4,166,518 |

**CLASS 188**

| | |
|---|---|
| 29 | 4,166,519 |
| 33 | 4,166,520 |
| 251 M | 4,166,521 |
| 287 | 4,166,522 |
| 322 | 4,166,523 |

**CLASS 193**

| | |
|---|---|
| 34 | 4,166,524 |

**CLASS 198**

| | |
|---|---|
| 437 | 4,166,525 |
| 458 | 4,166,526 |
| 486 | 4,166,527 |
| 825 | 4,166,528 |

**CLASS 200**

| | |
|---|---|
| 51 R | 4,166,934 |
| 72 R | 4,166,935 |
| 82 B | 4,166,937 |
| 82 E | 4,166,936 |
| 153 G | 4,166,938 |
| 160 | 4,166,939 |

**CLASS 202**

| | |
|---|---|
| 234 | 4,166,769 |

**CLASS 203**

| | |
|---|---|
| 2 | 4,166,770 |
| 58 | 4,166,771 |
| 60 | 4,166,772 |
| 72 | 4,166,773 |
| 82 | 4,166,774 |

**CLASS 204**

| | |
|---|---|
| 1 T | 4,166,775 |
| 25 | 4,166,776 |
| 28 | 4,166,777 |
| 55 R | 4,166,778 |
| 67 | 4,166,779 |
| 99 | 4,166,780 |
| 109 | 4,166,781 |
| 129.3 | 4,166,782 |
| 192 R | 4,166,783 |
| | 4,166,784 |
| 296 | 4,166,785 |

**CLASS 206**

| | |
|---|---|
| 45.34 | 4,166,529 |
| 315 B | 4,166,530 |
| 320 | 4,166,531 |
| 333 | 4,166,532 |
| 366 | 4,166,533 |
| 429 | 4,166,534 |
| 470 | 4,166,535 |
| 524.3 | 4,166,536 |
| 535 | 4,166,537 |
| 628 | 4,166,538 |
| 629 | 4,166,539 |

**CLASS 208**

| | |
|---|---|
| 8 R | 4,166,786 |
| 120 | 4,166,787 |

**CLASS 209**

| | |
|---|---|
| 39 | 4,166,788 |
| 219 | 4,166,789 |
| 555 | 4,166,540 |
| 587 | 4,166,541 |

**CLASS 210**

| | |
|---|---|
| 15 | 4,166,790 |
| 120 | 4,166,791 |
| 131 | 4,166,792 |
| 315 | 4,166,793 |

**CLASS 212**

| | |
|---|---|
| 55 | 4,166,542 |

**CLASS 215**

| | |
|---|---|
| 256 | 4,166,552 |

**CLASS 219**

| | |
|---|---|
| 74 | 4,166,940 |
| 124.34 | 4,166,941 |
| 137 R | 4,166,942 |
| 159 | 4,166,943 |
| 330 | 4,166,944 |

**CLASS 220**

| | |
|---|---|
| 85 VR | 4,166,550 |
| 308 | 4,166,548 |
| 319 | 4,166,549 |
| 339 | 4,166,547 |

**CLASS 221**

| | |
|---|---|
| 51 | 4,166,551 |

**CLASS 222**

| | |
|---|---|
| 181 | 4,166,553 |
| 182 | 4,166,554 |

365 4,166,555

**CLASS 223**

112 4,166,556

**CLASS 224**

42.1 F 4,166,560
101 4,166,557
158 4,166,558
276 4,166,559

**CLASS 226**

105 4,166,561

**CLASS 228**

5.1 4,166,562
47 4,166,563
156 4,166,564

**CLASS 229**

8 4,166,565
17 R 4,166,566
23 BT 4,166,567
23 C 4,166,569
23 R 4,166,568
52 B 4,166,570
65 4,166,571

**CLASS 232**

1 R 4,166,572

**CLASS 233**

26 4,166,573

**CLASS 235**

375 4,166,574
379 4,166,945

**CLASS 236**

12 R 4,166,575

**CLASS 239**

11 4,166,576
102 4,166,577
242 4,166,578
526 4,166,579
542 4,166,580
683 4,166,581

**CLASS 241**

16 4,166,582
73 4,166,583
261.3 4,166,584
275 4,166,585

**CLASS 242**

18 A 4,166,587
18 PW 4,166,586
67.1 R 4,166,588
75.4 4,166,589
75.51 4,166,590
84.21 A 4,166,591
107.4 A 4,166,592
199 4,166,593
214 4,166,594

**CLASS 244**

20 4,166,595
30 4,166,596
160 4,166,597
4,166,598

**CLASS 246**

63 A 4,166,599

**CLASS 248**

59 4,166,600
226.3 4,166,601
280.1 4,166,602

**CLASS 249**

20 4,166,603
122 4,166,604

**CLASS 250**

199 4,166,946
4,166,947
214 B 4,166,948
223 B 4,166,949
231 R 4,166,950
284 4,166,951
288 4,166,952
333 4,166,953
338 4,166,954
342 4,166,955
370 4,166,956
445 T 4,166,957
480 4,166,958
551 4,166,959
573 4,166,961
574 4,166,960

**CLASS 251**

129 4,166,605
214 4,166,606
335 B 4,166,607

**CLASS 252**

8.1 4,166,743
8.8 4,166,794
48.6 4,166,795
4,166,796
4,166,797
63.5 4,166,798
182 4,166,799
316 4,166,800
361 4,166,801
373 4,166,802
4,166,830
402 4,166,803
408 4,166,804
430 4,166,805
437 4,166,806
439 4,166,807
455 R 4,166,808

**CLASS 254**

133 R 4,166,608
150 R Re.30,089

**CLASS 260**

16 4,166,809
27 R 4,166,811
42.47 4,166,812
45.75 N 4,166,814
45.75 S 4,166,815
45.8 N 4,166,813
239 A 4,166,816
239.1 4,166,817
244.4 4,166,810
326.4 4,166,820
340.2 4,166,821
380 4,166,822
403 4,166,823
429 R 4,166,824
455 R 4,166,825
509 4,166,826
553 R 4,166,827
561 N 4,166,828
602 4,166,829

**CLASS 264**

1 4,166,831
279 4,166,832
540 4,166,833

**CLASS 266**

86 4,166,609
89 4,166,610

**CLASS 267**

3 4,166,611
65 R 4,166,612

**CLASS 270**

21 4,166,613

**CLASS 271**

3.1 4,166,614
259 4,166,615

**CLASS 273**

73 G 4,166,616
95 H 4,166,617
96 R 4,166,618
106.5 B 4,166,619
126 R 4,166,620

**CLASS 274**

1 R 4,166,621
4,166,622
4,166,623
9 C 4,166,624
23 R 4,166,625
47 4,166,626

**CLASS 277**

95 4,166,627
152 4,166,628

**CLASS 280**

11.28 4,166,629
87.02 R 4,166,630
242 WC 4,166,631
502 4,166,632
504 4,166,633
614 4,166,634
625 4,166,635
4,166,636
4,166,637
638 4,166,638
704 4,166,639
711 4,166,640
735 4,166,641
806 4,166,642

**CLASS 282**

11.5 A 4,166,643
27.5 4,166,644

**CLASS 292**

216 4,166,645
336.3 4,166,646

**CLASS 294**

64 R 4,166,648
65.5 4,166,649
78 A 4,166,647

**CLASS 296**

78.1 4,166,650
84 B 4,166,651

**CLASS 299**

43 4,166,652

**CLASS 301**

37 SS 4,166,653

**CLASS 303**

14 4,166,654
87 4,166,655
115 4,166,656
116 4,166,657

**CLASS 307**

237 4,166,962
260 4,166,963
296 R 4,166,964
299 R 4,166,965

**CLASS 308**

15 4,166,658
175 4,166,659
202 4,166,660
207 R 4,166,661
235 4,166,662

**CLASS 310**

111 4,166,966
239 4,166,968
338 4,166,967

**CLASS 313**

371 4,166,969

**CLASS 318**

561 4,166,970
575 Re.30,091

**CLASS 323**

4 4,166,971

**CLASS 324**

0.5 AC 4,166,972
58.5 B 4,166,973
60 CD 4,166,974
116 4,166,975
166 4,166,976
173 4,166,977

**CLASS 325**

22 4,166,978
321 4,166,979
363 4,166,980

**CLASS 330**

52 4,166,981
259 4,166,982
297 4,166,983

**CLASS 331**

1 A 4,166,984
94.5 PE 4,166,986
94.5 S 4,166,985

**CLASS 333**

109 4,166,987

**CLASS 335**

9 4,166,988
17 4,166,989
216 4,166,990
261 4,166,991

**CLASS 336**

155 4,166,992

**CLASS 337**

66 4,166,993
350 4,166,994
386 4,166,996
390 4,166,995

**CLASS 338**

5 4,166,997
4,166,998

**CLASS 339**

49 B 4,166,663
91 R 4,166,664
112 L 4,166,665
118 R 4,166,666
176 MP 4,166,667

**CLASS 340**

43 4,167,001
59 4,167,002
501 4,167,003
679 4,167,004
762 4,167,005

**CLASS 343**

6.5 LC 4,167,006
4,167,007
18 B 4,167,009
18 E 4,167,008
700 MS 4,167,010
749 4,167,011

**CLASS 346**

62 4,167,012
75 4,167,013
4,167,014

**CLASS 350**

87 4,166,671
96.14 4,166,669
96.20 4,166,668
4,166,672
96.23 4,166,670
97 4,166,673
175 ML 4,166,674
252 4,166,675
357 4,166,676

**CLASS 351**

16 4,166,677

**CLASS 354**

23 R 4,166,678
60 R 4,166,679
126 4,166,680
149 4,166,681
187 4,166,682
192 4,166,683
203 4,166,684
231 4,166,685
266 4,166,686
290 4,166,687
319 4,166,688
321 4,166,689

**CLASS 355**

3 CH 4,166,690
11 4,166,691
14 4,166,692
61 4,166,693
77 4,166,694

**CLASS 356**

28 4,166,695
223 4,166,696
319 4,166,697
338 4,166,698
375 4,166,699
381 4,166,700
404 4,166,701
440 4,166,702
442 4,166,703

**CLASS 357**

16 4,167,015
17 4,167,016
24 4,167,017
51 4,167,018

**CLASS 358**

22 4,167,019
36 4,167,020
4,167,021
41 4,167,022
127 4,167,023
128 4,167,024
243 4,167,025

**CLASS 360**

15 4,167,026
37 4,167,027
72.2 4,167,028
99 4,167,029

**CLASS 361**

154 4,167,030
388 4,167,031
415 4,167,032

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60 4,167,035
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79 4,167,037

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900 4,167,040
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495 4,166,883

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10 4,166,884
15 4,166,885
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194 4,166,888

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286 4,166,768

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92 4,166,P.0

**CLASS 525**

329 4,166,891
373 4,166,892

**CLASS 526**

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223 Re.30,090

**CLASS 528**

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272 4,166,895
301 4,166,896
398 4,166,897
405 4,166,898
480 4,166,899
491 4,166,900

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9 4,166,901
48 4,166,902

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426 4,166,903
427 4,166,904

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111 4,166,907
166 4,166,908
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61 4,166,912
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652 4,166,914
820 4,166,915
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## CLASSIFICATION OF DESIGNS

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D1— | 15 | 252,776 | | 191 | 252,785 | | 43 | 252,795 | | 96 | 252,805 | D19— | 54 | 252,815 | | 55 | 252,823 |
| D3— | 35 | 252,835 | | | 252,786 | | 147 | 252,796 | | 129 | 252,806 | D21— | 74 | 252,829 | | | 252,824 |
| D6— | 5 | 252,777 | D7— | 99 | 252,787 | | 192 | 252,797 | | 158 | 252,807 | | 76 | 252,816 | D27— | 36 | 252,825 |
| | | 252,778 | | 108 | 252,788 | | 216 | 252,798 | D12— | 34 | 252,808 | | | 252,817 | D28— | 22 | 252,826 |
| | 28 | 252,779 | | 137 | 252,789 | | | 252,799 | D14— | 96 | 252,809 | | 92 | 252,830 | | 61 | 252,827 |
| | 29 | 252,780 | | 150 | 252,790 | | 252 | 252,800 | | | 252,810 | D22— | 28 | 252,818 | | | 252,828 |
| | 31 | 252,781 | | 152 | 252,791 | D10— | 15 | 252,801 | D15— | 7 | 252,811 | D23— | 34 | 252,819 | D48— | 20 D | 252,831 |
| | 66 | 252,782 | D8— | 358 | 252,792 | D11— | 29 | 252,802 | | 35 | 252,812 | D24— | 1.1 | 252,820 | | 20 E | 252,832 |
| | 95 | 252,783 | | 377 | 252,793 | | 79 | 252,803 | D16— | 65 | 252,813 | | 29 | 252,821 | | | 252,833 |
| | 164 | 252,784 | D9— | 10 | 252,794 | | 81 | 252,804 | D18— | 14 | 252,814 | | 52 | 252,822 | | 24 R | 252,834 |

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| 6 : 252,819 | 252,814 | 09 : 252,813 | 20 : 252,818 | 37 : 252,784 | 42 : 252,793 |
| 9 : 252,777 | 252,816 | 13 : 252,780 | 25 : 252,794 | 252,787 | 252,831 |
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